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Contractors' Problems

THE problems with which the electrical contractors deal at their annual conferences are fundamentally the same year by year; the presidential address and papers merely deal with new aspects or report the progress made in each direction. Thus it is at Eastbourne this year.

In one important direction—municipal trading—there appears to have been an easing of the situation, partly because each side is gradually coming to appreciate the other's point of view. The President speaks of a "score" of municipalities which now have working arrangements with local contractors, while Mr. Penwill maintains that contractors must be prepared for municipalities to run showrooms if contractors are unable or unwilling to do so.

Showrooms are essential to progress (particularly in the domestic field), but they are expensive to run and municipalities are compelled to make them pay.

Another aspect of "fair trading," as the contractor interprets this term, is the continued granting of trade discounts to those who are not entitled to them. Here the contractor is up against human nature. The manufacturer is naturally anxious to sell as much as he can, while the public is out for the lowest terms.

The contractor must show the manufacturer that in the long run it will pay him to conduct his business through the regular channels, and at the same time must educate the public to regard him as a guide, philosopher and friend. He must stress the idea of immediate and effective service—a service which is essentially local in character, intimate and personal.

The manufacturers are already being won over section by section, for the Trading Committee has negotiated agreements with the cable, lamp, accumulator, and dynamo and motor manufacturers. This must go a long way towards securing settled and fair trading conditions. In this matter, however, the competition of foreign material, freely available to contractors of the baser sort, has to be considered.

In both the foregoing matters the contractor would be immensely helped by the elimination of the incompetent, and often dangerous, individual who usurps his title to the disadvantage of the public and the detriment of the industry. It seems clear that the only means of obtaining the desired effect is the institution of a national wiring code, enforcing a reasonable standard of material and workmanship. And it is just as clear that such a code would be of no effect without being made compulsory by legislation.

Alderman Tweedy-Smith suggests that the Institution of Electrical Engineers, the E.C.A. and the National Register should combine, on the lines of the British Medical Association, as such a combination could obtain statutory powers that could not be gained individually. This, however, does not seem to get us much further. For all practical purposes, the National Register is a combination of the I.E.E. and the E.C.A., strengthened by representatives of other interested bodies. Now the National Register realises that it is not yet strong enough to seek legislative sanction to enforce regulations, desirable as that may be. And it will never be strong enough until it is fully recognised by the supply authorities,

who, if they do not actually control, can influence the placing of, installation work.

Therefore we suggest that legislative force for wiring rules can only be obtained piecemeal by enlightened authorities following the example of West Ham and obtaining Parliamentary sanction to the institution of by-laws governing electrical installations in their areas.

In West Ham's case conformance with the I.E.E. Rules is required. Some contractors consider that this imposes too high a standard if work is to be carried out at a sufficiently low price. On the other hand, the stipulations of the National Register are of a negative character; that is, they enumerate certain "crimes" which a registered contractor must not commit.

Cannot the I.M.E.A. and the E.C.A. get together and evolve a policy whereby the contractors and the supply authority will afford each other mutual assistance in carrying out their proper functions?

Undue Caution

THE practice of many electrical engineers of using for installation work switch- and fuse-gear designed for working at voltages higher than those of the circuits in which the equipment is to be employed is no longer pardonable. More than a decade ago there was perhaps some justification for the adoption of 500-V apparatus for use on circuits working at up to 250 V, but that playing for safety became a habit which has now reached serious proportions, especially as the practice appears in some quarters to have crept into the domestic supply field. Experience and research have resulted in manufacturers being able accurately to design equipment to work efficiently at given pressures with adequate protection against dampness, salt-laden atmospheres, and other troubles of the installation engineer. The habit must be strongly condemned as adding unnecessarily to installation costs.

A Wise Decision

As we anticipated in our issue of May 15th, the commonsense of the employers and employés in the engineering industry has prevailed, and, unless something very untoward happens before the end of the month, new working conditions will be instituted, representing a modification of the terms originally put forward by the employers. A stoppage in the industry would merely have intensified the unsatisfactory conditions which already prevail. The new terms call for a sacrifice from the men who, as the employers realise, are already not too well paid. We trust that the emergency which demands this sacrifice will soon pass and allow the conditions of this important section of the community to be, at least, restored to the existing level.

Callenders' Activity

IN the course of his speech at Callender's annual meeting, the chairman, Sir J. Fortescue Flannery, touched upon some of the handicaps under which the company had been operating recently, but both he and Sir T. O. Callender, the deputy chairman and managing director, read the signs of coming trade improvement with careful optimism. Orders for the classes of product used in domestic installation work exceeded expectations last year, and one ground for hope in this connection is to be found in the certainty that as we have lagged behind electrically in Great Britain in the past there should be a larger future demand. Sir Fortescue mentioned the setting up of a special renewals and contingency account which had become necessary consequent upon the important pioneering work of the company in the development and manufacture of cables for higher pressures. Members of Cable Research are acting in close co-operation. The wayleave difficulty has been holding up overhead distribution work for the south-eastern grid, but we gather that these things are now working more smoothly. Sir T. O. Callender, who has long taken a very active interest in overseas developments, was able to show that notwithstanding all that has been happening in China and in India, Callender's had done considerable business in those vast and troubled territories. One of the signs of the approach of "Springtime" after the long winter of our industrial discontent is found in the placing of a number of orders from Home colliery proprietors during the last few weeks.

Cardiff's Claim

IN a recent issue we commented on Birmingham's attainment of its hundred-thousandth consumer, incidentally pointing out that the undertaking appeared to have connected up half of the households in its area. A Cardiff correspondent maintains that his city's record is even better than Birmingham's. Although the number of consumers which the Electricity Department now supplies is 35,000, against over 100,000 in Birmingham, the population is under 250,000 against Birmingham's million. Thus there are about 50,000 households, calculated on the basis of five to a household, and 70 per cent. of them are enjoying electrical service. For this result credit is due to the work of the city electrical engineer, Mr. C. G. Morley New, who, incidentally, is the president of the I.M.E.A. By means of the popular assisted-wiring scheme and judicious advertising it is hoped to improve upon this position during the current year.

Rational Distribution

COMMENTING on the I.M.E.A. presidential address at Torquay two years ago, we expressed the view that rationalisation of distribution would present very much greater difficulties than did the reorganisation of generation. This view was borne out in the discussion at Scarborough on Mr. Nichols Moore's paper in which he developed his original theme. Statutory powers have been given to undertakers to supply electricity, to which generation is only an incidental and largely a technical adjunct, and the limitation of such powers is likely to arouse even greater controversy than in the case of the 1926 Act, and this probability appears to have been in the mind of the advisors of the L.C.C. in 1914. It was suggested in the discussion that the majority of undertakings were now serving a large majority of consumers very well and that all that was required was to bring a few backward undertakings up to the level of the others. The point is, however, whether the present methods of distribution enable the best possible progress to be made, since the good may be the enemy of the best. In any case the subject is one with which supply engineers must get to grips at once, so that if and when any proposals are officially mooted they may have their own definite views ready.

The Illumination Congress

AMBITIOUS plans are maturing for spectacular illuminations and the floodlighting of prominent buildings during the first three weeks of September when delegates from most of the leading countries of the world are to visit Britain for the triennial International Illumination Congress. Organised by the National Illumination Committee of Great Britain and the Illuminating Engineering Society, London, and held under the auspices of the International Commission on Illumination, a very full programme has been prepared for the interest and instruction of delegates in London, Glasgow, Edinburgh, Sheffield, Buxton, Birmingham, and Cambridge—an unprecedented opportunity for British illumination engineers to show what they have done and are doing. Not merely is there work to be done; it *must* be done if progress in illumination is not to be retarded. The machinery for conducting such work exists effectively in the I.C.I. and the recent adhesion to the Commission of a number of progressive countries in which the study of lighting is now being prosecuted with vigour is an encouraging sign that the above-mentioned facts are being recognised generally and is one of the best forms of guarantee of the future active life of the Commission and the achievement of its aims.

The Contractors' Conference

Proceedings at the Eastbourne gathering of the E.C.A.

THE triune contractors' organisation—the Electrical Contractors' Association, Inc., the N.E.C.T.A., Ltd., and the National Federated Electrical Association—commenced its sixth annual conference on Wednesday.

The Council held its customary meeting in the morning, and during the day about 400 delegates and visitors arrived to be in time for the reception by the president (Mr. H. C. Hazel) at the Town Hall in the evening. At this function full advantage was taken for the opportunity of renewing friendships formed at previous conferences, and the presence of a goodly proportion of ladies made the dance a very successful affair.

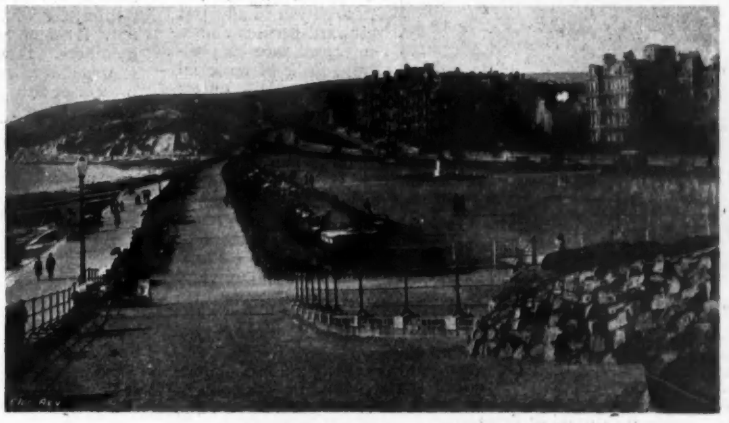
Although the evening was a long one, members arrived back at the Town Hall the following (Thursday) morning with commendable promptitude for the annual general meeting. At the close of this business they reassembled to receive a civic welcome to Eastbourne and to hear their president express the Associations' thanks for the town's cordial reception.

Mr. Hazel then delivered his presidential address, a *résumé* of which appears below, and the official photograph was the next item in the somewhat crowded morning programme.

The afternoon session was devoted to the reading and discussion of Alderman Tweedy-Smith's paper on "Law Relating to Electrical Contractors"; the arrangements for the evening included the usual smoking concert—also at the Town Hall.

Friday's business commences with the reading by Mr. L. C. Penwill of his paper on "Fair Trading within the Electrical Industry"—a subject of extreme importance to contractors above all branches. Both this paper and Alderman Tweedy-Smith's appear in abstract form in subsequent pages of this issue.

At the close of the discussion, the ceremony of installing the new president takes place, and Mr. W. R. Rawlings will respond with a brief address. The morning session concludes with votes of thanks to all who have assisted in organising the conference and have contributed to the proceedings. The afternoon is to be devoted to a garden party at Devonshire Park, and in the evening, on the invitation of the Mayor, there will be a ball and supper at the Town Hall. This ends the official programme, but arrangements have been made for members desirous of staying in Eastbourne for the week-end.



On the Eastbourne Front

The Presidential Address

IN his introductory remarks Mr. Hazel congratulated the Electrical Association for Women on the vigorous work that that organisation was doing. He knew of no more important work that confronted them to-day than the mass education of the people in the advantages and amenities that really comprehensive electrification could bring into their lives. The E.A.W. had emphasised again and again that they must institute electrical educational work in the schools and training colleges. A suggestion had been made in connection with the Faraday Centenary, that the scholars in the national schools might be invited to write essays on Faraday's life and work—or rather, upon the modern outcome of that work—for a series of modest local and national prizes. He thought that the Association might perform a very useful function in the cause of general development if it provided these prizes.

He felt that they were making very slow progress in connection with the "demonstration palace"—to use the phrase employed by Sir Hugo Hirst. If it was necessary for the lamp manufacturers to educate the trade and the public up to "more and better lighting," then how much more necessary was it to provide continuous lecture-demonstrations on heating and power applications? What practical machinery existed to bring the question of electro-farming prominently before agricultural colleges and the rural community? Spasmodic efforts here and there did little more than scratch the surface of the possibilities.

At the present moment there were two fields of major electrical development confronting them, the gigantic domestic power field and rural electrification. If real progress was to be made in either direction their factory experience of the past must be consulted and brought to their aid. He had no desire to belittle in any way the supremely important character of lighting propaganda and the lighting load. It had been demonstrated that lighting was capable of being developed up to the point of providing a load factor of no mean dimensions. Lighting was capable of supporting a fair and remunerative price per unit, and the price of lighting energy might be made to render a measure of support to the other uses of electricity, permitting the supply industry to frame really attractive tariffs for heating and power purposes.

He believed that the day was coming when electricity for all purposes would be charged for at the same low and uniform rate; but, facing the facts as they existed at the present day, it was apparent that the lighting load was worthy of every possible encouragement. But anxiety to secure the largest possible lighting load in the shortest possible time and at the lowest possible cost had resulted in the introduction of wiring systems, methods and materials, which must cause at least a measure of grave disquiet to those who had the true interests of our great industry at heart.

It was possible to profit from the experience of competitors or opponents. The gas industry had long since got away from the cheap-jack installation practice that at one period was closely associated with the commercial development of that public service. The gas installation of to-day represented a solid job, and the electrical installation—particularly on its heating and power sides—must be given the same characteristics. The constant endeavour to produce the cheapest possible job might lead them into a welter of future trouble.

He desired to pay tribute to the broadminded management of the Electricity Department and municipal electrical showrooms of Eastbourne, under Mr. J. K. Brydges. The Corporation made no attempt to use the showrooms to the detriment of local traders. On the contrary, members of the Association carrying on business in Eastbourne provided a considerable quantity of the fittings and apparatus on view, which were sold from the showrooms on their behalf.

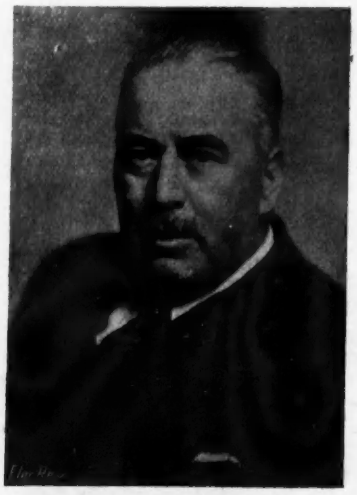
The dogmatic opposition of electrical contractors to the opening of such central showrooms represented a very short-sighted policy. If the organised electrical traders in any particular area were prepared to take over the finance, equipment and running of such impressive and central electrical showrooms, all well and good. But, if the private retail trade was unwilling or unable to organise such centres of public electrical education and appeal, then it was a very poor policy to stand in the way of those who were prepared to do so. It was the men who were prepared to move with the times, to take the broad and long view, and who were out to help and not to hinder, who, even in the short run, secured the business.

The installation engineer of the future must be a "big" man if he was to cater for the mixed and multitudinous requirements of the general community—commercial, industrial, agricultural, professional and domestic. The contractor required to be a travelling encyclopædia concerning the special needs of those specialist activities and occupations, and he could afford to neglect no opportunity to widen his knowledge and to increase his appreciation of the electrical possibilities.

He believed that the installation trade of this country needed outspoken leaders. He urged that the truth should be spoken and heard, letting the consequences take care of themselves. He denied absolutely any inclination to pessimism. On many occasions he had seen what could be done by all sections of the trade or, at any rate, by the members of two sections of the trade, who would get together and work together on broad, enlightened and give-and-take lines. That had been achieved in Eastbourne and in a score of places.

Those examples gave them a lead and encouragement to secure sane and ordered trading conditions in all sections of the industry and in all localities. In spite of the mistakes of the past, in spite of the "individual" attitude of mind which seemed to dictate a policy of grief and obstruction rather than one of buoyant and helpful activity, collectively they had the ball at their feet if they could only get together and play the game, thereby setting an example to others.

The President's Annual Report



Mr. H. C. Hazel, M.I.E.E., the President of the Electrical Contractors' Association, whose report is dealt with on this page, is proprietor of the firm of Lindsay & Co., Liverpool, and has been active in the Association's affairs for many years. (*Photograph by Elliott & Fry.*)

REVIEWING the work of the Associations during the past year the President said that while it could not be claimed that the results achieved had been spectacular, there had never been a period when the Association had put forward greater efforts to consolidate its position, to be of material benefit to its entire membership, and to endeavour to take its proper place in the industry.

The trade depression had exercised a very adverse effect upon the business of the members. Turnover had fallen and work had been reduced to an unprofitable level by unnecessary and foolish competition. It was hoped that this period of depression was on the wane and that confidence would be established in the business life of the country. The Development Committee had done much in districts in which the Association hitherto had been poorly represented. The vast majority of electrical contractors deserving of the name were already inside the Association's ranks, and it only remained for the comparatively few reputable men outside to realise their obligations to the industry by joining an Association which had now for nearly thirty years looked after their interests. The total membership as at April 30th, 1931, was 1,195, showing a net increase of 55. That increase would have been greater but for the fact that several resignations had been received during the year, mostly from victims of the serious trade depression.

Insurance and Assisted Wiring

During the year the Law and Parliamentary Committee had negotiated an insurance policy by which any third-party claim against a member for fire in excess of £10,000 was covered automatically by the Association's policy. The collective bargaining by the Association on insurance matters had produced results which could not have been achieved individually.

The Council had done its best during the past year to protect members against prosecutions when certain of the conditions of the Factory Act had not been complied with by a superior employer. The Council realised the necessity for making such representations to the Home Office as would define clearly the question of responsibility.

With the general advent of assisted-wiring schemes negotiations between the supply authorities concerned and local electrical contractors had ensued, and the cases in which the supply authority had found it necessary to inaugurate its own wiring department had been almost negligible. Assisted-wiring schemes were recognised as being the only means of developing electricity among a large proportion of the population, and it was the policy of the Association to co-operate in these schemes. There was something radically wrong with the supply authority which continued to ignore the electrical contractors in its area. There were still recalcitrant supply authorities which retarded the progress of electricity instead of adopting every possible means to increase its development, by imposing onerous and burdensome conditions before a supply was given. An educational campaign directed towards such short-sighted members of the electrical community seemed necessary.

The Need for a Wiring Code

The necessity for satisfactory wiring rules was generally appreciated, but supply authorities' regulations not only differed in their character but also in the degree to which they were enforced. Efforts must be made to secure uniformity in this respect. It was to be hoped that the time was not far distant when appropriate legislation would correct the present state of chaos by the introduction of a very definite code of wiring regulations. A compulsory standard would bring with it a greater opportunity for mass production by the manufacturers, and that must mean a guaranteed standard article at a reduced price.

The activities of the Apprenticeship Advisory Committee still continued and the Association, by the award of medals and grants, continued to encourage ambitious apprentices to fit themselves for positions of trust and utility in the industry.

The Electric Fittings Statutory Committee set up under the 1926 Electricity (Supply) Act, still continued to function, but during the past year the need for its assistance had been almost infinitesimal.

Mr. R. Grierson had made invaluable suggestions regarding the rating of domestic sub-circuits and the rationalisation of house wiring cables, which tended to standardisation and simplification. All branches of the Association were considering and voicing their views on the matter so that appropriate action might be taken by the Council.

Negotiations between the Royal Institute of British Architects and the builders had reached a state which, in a very short while, would be productive of a new form of main contract which was calculated to protect the interests of sub-contractors in many directions. In the meantime the Joint Committee of Specialist Associations had been engaged on a new form of building sub-contract which had been issued to members. It was intended upon the issue of the form of main contract that negotiations should take place immediately upon a form of sub-contract.

The Trading Committee's Activities

Questions submitted to N.E.C.T.A., Ltd. (the Trading Committee), are examined in the light of the Fair Trading Policy published by the Association in 1923. It was the Association's policy to protect the interests of its membership by negotiation with the associations representing the manufacturing and wholesale sections, and far-reaching and important conclusions had been the outcome of a series of conferences with the Electric Lamp Manufacturers' Association. Joint meetings had taken place between the Trading Committee and other associations during the past year and arrangements had been arrived at with the C.M.A., the A.M.A., and with dynamo and motor manufacturers. Any system of ordered trading was open to attack and abuse, and definite obligations rested upon all members of the Association to see that these abuses and attacks were reduced to a minimum.

By far the greatest achievement of the year had been in connection with the activities of Committee "D," consisting of representatives of all sections of the industry. A Fair Trading Policy had now been issued and, during the next few months would be placed before the various sections. By setting up a central authority to deal with matters of principle the labours of Committee "D" would bring the various sections of the industry closer together than they had ever been before.

The Association continued to set its face against the issue of net price lists, as much inconvenience and trouble was caused by members of the public being placed in possession of private and confidential information as between the manufacturer and the retailer.

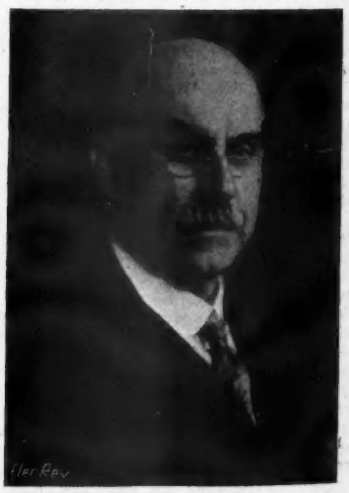
Wages and Conditions

The negotiations of the National Federated Electrical Association with the Electrical Trades Union during the past year had been harmonious. A revised agreement was entered into and now a committee was considering the possibility of a definite review of the whole of the national standardised wages agreement to bring the present system of grading into conformity with the general electrical aspect of the country; the possibility of a national code of working rules covering the varying requirements which now obtained; and the subject of apprenticeship and the inauguration of a fair and equitable arrangement as to wages and working conditions.

With regard to the last, such practical working arrangements would tend to check the unfair tactics of the employer who engaged boy labour for the sole purpose of increasing his own immediate profit.

The Association deplored the action of a particular section of the E.T.U. which resulted in the London strike in March last. The decision of the N.F.E.A. to withdraw the 5 per cent. temporary increase in the London area was only taken after very careful consideration, and after giving the Electrical Trades Union ample time to reconsider the definite breach of agreement which it had committed by calling out its members on strike.

During the early part of the year they had secured new headquarters premises which should be ample, both from the point of view of size and adaptability to conduct the Association's affairs with efficiency for a good number of years.



Mr. W. R. Rawlings, A.M.I.E.E., the President-elect, was chairman of the National Electrical Contractors' Association in 1902. He became first President of the E.C.A. upon its incorporation in 1904-05 and was again elected to the chair in 1914-15. He is chairman and joint managing director of Rawlings Bros., Ltd., and a director of the Sun Electrical Co., Ltd., and other companies. (*Photograph by H. J. Whitlock & Sons.*)

Law Relating to Contractors. Alderman R. Tweedy-Smith, LL.D.

Abstract of a paper read at the E.C.A. Conference

IN addition to various Acts of Parliament which affect electrical contractors, there is what may be termed judge-made law, which rests upon equitable principles slowly evolved in the course of centuries.

If a contractor is not acting under a consulting engineer and holds himself out as competent to give advice, then he is under the same obligations and liabilities as a consulting engineer. What are they?

Negligence

The question whether a person has exercised *reasonable and proper care* is one of fact which appears to rest on the further inquiry whether other persons exercising the same profession or calling, and being men of experience and skill therein, would or would not have come to the same conclusion. It is not enough to make a man liable in an action for negligence. If advice is negligently given, it must be acted upon before any liability of this nature can arise; the amount of damage that can be awarded is to be *measured by the consequent loss to the employer*, and it is immaterial that such damages may exceed the amount of the remuneration charged by the contractor.

Interference by Employer

If the employer insists on superseding the contractor's judgment and asserting his own in matters which relate to work which the contractor is employed to carry out, or gives orders which are ignorant and unskilful, he cannot complain if the contractor follows his orders; the contractor, before complying with the orders, should be careful to point out the consequences which may result from their adoption and disclaim all responsibility therefor.

Sub-Contractors

Very often electrical contractors are sub-contractors. Take the case of a municipality advertising for tenders for electrical work. The successful contractor may receive an intimation that he will receive an order from the builder who was also a successful tenderer. The order comes along, but no contract is entered into with the builder. The builder makes some payments on account and then goes bankrupt. Can the electrical contractor recover from the municipality, or must he claim in the bankruptcy proceedings of the builder? Very little will turn the scale either way; the reported cases are numerous and sometimes appear to be very conflicting. The reason is that, in order to do justice, a judge will always try to find some fine distinction in favour of the litigant who appears to have equity and merit on his side. In the case above mentioned, if the electrical contractor entered into a separate and independent contract with the builder, he would not then be able to recover from the municipality. If he asked the municipality for a contract (which he is entitled to do, as all such contracts over £50 should be under seal) he would have safeguarded himself.

Extras

It is often a matter of great difficulty to determine whether an item of workmanship or materials claimed as an extra by a contractor is fairly so or not. In fact, many disputes turn on this point. In a court of law not only must the original contract be produced, and proved, in order to show that the alleged extras are not included in it, but evidence must also be given that it was the subject of a new contract containing a promise expressed, or implied, on the part of the employer to pay for it. Mere acquiescence on the part of the employer in a suggested alteration is not enough unless it can be shown that the employer was aware that the alteration would add to the expense. When, however, the contract provides that the engineer is to determine the price to be paid for extra work it would appear that he is entitled to say what are extras and what are not, and it would appear that when the architect is the party appointed by the contract to issue written orders for extra work the order of the employer for such works *verbally* given will not entitle the contractor to recover. If an employer consents to alterations and the contractor does not inform him that the alterations will increase the expense, then the contractor cannot recover for the increased expense. What would amount to a waiver of the condition as to the written order cannot be very closely defined, as there is no express authority on the point. If it can be shown that the extra works claimed for are entirely outside the contract, the want of a written order will not bar the contractor's claim to be paid for such work.

Time for Completion

When the contractor undertakes to carry out work "forthwith," "immediately," or "directly," the Courts will hold that all that is meant by such indefinite words is that the work shall be carried out as quickly as in the circumstances is reasonably possible. When the date of completion is expressly stated, formerly the rule at law was that failure to complete entitled the employer to repudiate the contract and to refuse payment. This rule, however, was relaxed in equity. If time is not of the "essence of the contract," failure to observe it, though a ground for compensation to the employer, is not a sufficient breach to entitle him to repudiate the contract.

Delays

If a contractor is delayed by failure of an architect or consulting engineer to deliver plans or other necessary instructions, he is free from penalties under the contract. Interference by an employer or his agent with a contractor is also a good defence for not completing in the specified time. Contractors will be well advised to let their employers or their architects know when any delay is anticipated or experienced through the default of others. Additional work must, of course, be done in a reasonable time, but if it is so mixed up with the original contract, being part and parcel thereof, that it becomes impossible to complete the original until the additional work has been completed, then there is good defence against any penalties.

Alderman R. Tweedy-Smith, LL.D., is a member of the Southend Town Council Electricity Committee and chairman of the Sun Electrical Co., Ltd. He has been solicitor to the E.C.A. for many years.

Even in a contract which provides for additions, deductions, alterations, and deviations to and from the contract work, and also for the architect or engineer to have power to extend the time for completion of the contract, and that unless he does so, the time shall be deemed not extended by reason of such extra work, it has been held that the fact of extra work being directed having rendered the contract *impossible* within the appointed time, freed the contractor from the penalties provided by the contract.

Payments on Account

When A agrees to do work and supply materials upon the premises of B for a specific sum and nothing is said as to payments on account, then A is not entitled to recover anything until the whole work is completed.

Consulting Engineers

Professional persons must not misrepresent professional status; for example, a contracting engineer must not act as a consulting engineer unless he has the qualifications to do so. A contracting engineer must see that the quality of his work and of the plant, material, or appliances are reasonably *sufficient* for the purposes intended. Of course, a *manufacturer* is under the same liability also. If damage results from tempest, rain, floods, or fire, a contractor is liable to make good unless he covers himself in the contract. He is not responsible for errors in design made by an architect or consulting engineer.

Factory Acts

Obligations arise under the Factory and Workshops Acts, 1901, and the Building Regulations, 1926, that *every* contractor and employer of workmen (whether main contractor or sub-contractor) shall observe such of the requirements as affect any workman employed by him. It is obvious that the state of the law is very unsatisfactory and intricate, especially in view of the cases that have already come before the Courts. I advise contractors to write when accepting a contract stating that it is understood that the employer will provide that other contractors safeguard any risks caused by them.

The Future

The time has arrived for all engaged in the electrical vocation to band themselves together to obtain the same recognition that doctors, lawyers, dentists, and patent agents have. It is essential that the safety and welfare of the public should be in competent hands. My unofficial suggestion is that the Institution of Electrical Engineers, the E.C.A., and the National Register of Electrical Installation Contractors should form a combination with similar functions to those of the British Medical Association. Three powerful associations could obtain statutory powers when one could not. Persons desiring to practise or carry on business in any branch relating to electricity ought to be compelled to obtain the hall-mark of competency from such an association.

Where legislation affecting the members of such an association was proposed, the Government would always consult the association before finally completing the draft of a Bill. Where the law is vague and unsatisfactory, as in the case of the Factory and other Acts, the Government would always listen to powerful representations relating to this matter. Already to a certain extent this is being done in the electrical industry. The advantage of such an association would be that instead of proposals being considered sectionally, they would be considered from all points of view, including always the general welfare of the public. Complete co-operation is vital to success.

D

Fair Trading. By L. C. Penwill

The second paper read at the E.C.A. Conference

AT the very outset of this paper it must be made quite clear that the views expressed therein are not necessarily those of the Electrical Contractors' Association. The fact that since early in 1927 representatives of all sections of the electrical industry (known as Committee "D," which has prepared a Fair Trading Policy as applied to home trade) have assembled together for a period of nearly four years, indicates the universal recognition that there were—and I submit there still are—many difficulties which require solution. I am going to suggest that the putting into operation of the result of nearly four years' deliberations on the part of the Conference will go a long way to bring peace and harmony within the industry.

The draft policy which has been enunciated is still in a state of negotiation. Committee "D's" proposals are now before all sections of the industry. No satisfactory solution to diametrically opposite points of view was ever found that did not mean give and take on both sides, and if all concerned adopt a policy of mutual trust in the carrying into operation of the precepts laid down, I am quite convinced that the success of the policy will be assured. The first lesson all have to learn is that of mutual trust. The time is now opportune to put our own houses in order and to concentrate on the one thing which, after all, is the object of all in the industry, namely, to serve the public in the best possible manner.

In all our negotiations we must recognise the existence of the other fellow and, what is more, his *right* to exist. We must also recognise that if he is fulfilling a service to the industry and therefore to the public, he can reasonably expect that we shall protect his interests. In so far, however, as his right to exist depends entirely upon his ability to render service, we have, I think, to indicate very clearly and definitely that a progressive industry has no possible room for passengers or parasites.

Retailers

It seems to be of paramount importance that manufacturers' efforts should be reinforced and supported by a very strong and healthy body of retailers. In the past the retail section, generally, left room for a good deal of improvement, but contractors and retailers must be given a greater measure of protection than exists at the present time. It is not good enough that the retail trade should have to be content with the odds and ends which are sold over the counter. How often does the contractor find, when carrying out a fairly large installation, that the manufacturer has canvassed the client himself and secured the order for the fittings and apparatus upon the basis of full trade terms? If it is good enough for the customer to depend upon the contractor for the means by which he can use the fittings and apparatus, surely he should be able to complete the whole job without the unnecessary attentions of the manufacturers and wholesalers being thrust upon his client. It is this state of insecurity that has robbed him of the enthusiasm which should be his and which has allowed a very bitter state of mistrust to exist.

Overlapping

Quite apart, however, from this aspect of the case, there is undoubtedly a very serious state of overlapping and unnecessary waste which, in turn, is a burden upon the whole industry. Is it not a fact that the three main sections of the trading side of the industry are all trying to do the work which should be the province of one? Manufacturers' complaints of the poor premises and salesmanship ability of the retailer may be justified, but if a large volume of the trade to users which now goes direct to manufacturers or wholesalers passed through the hands of the retailer, this in itself would give him the encouragement and the chance of earning such a profit as would enable him more satisfactorily to fulfil the task which should be his province. By all means reduce the price to the consumer to the lowest possible economic level, but remember that there is also a lowest possible economic level so far as the contractor is concerned; that is, quantity for quantity he should always buy better than the user and *his* discount (*i.e.*, the "trade" discount) should be kept to the trade. Of course, certain very large industrial buyers legitimately come within the category of buyers direct from manufacturers or wholesalers. The last two groups, however, do not need the retail distributing establishments which are in existence to-day and constitute just a duplication of wasteful effort.

If the manufacturers and wholesalers closed down their retail establishments to-morrow, would the electrical contractor and retailer immediately provide suitable substitutes? The answer is obviously in the negative; such a change is impossible of accomplishment at a moment's notice; but with an increased sphere of operation for its activities, I am quite certain that the retail side of the industry would attract far more capital than it has in the past, as retailers, who are not in business for the benefit of their health, would not be slow to recognise the proper way to cater for these demands.

From how many contracts do we find electrical fittings, apparatus, and even lamps excluded, all these commodities being supplied by the manufacturer or wholesaler direct? Although the Electrical Contractors' Association agrees that when no service is rendered no remuneration is due, it is quite common practice for the manufacturers to allow a small courtesy discount, but the whole principle is entirely wrong. Why should the contractor not have an opportunity of really earning the discount by allowing him to supply the goods?

Over-Anxious to Please

I am quite convinced that the industry is the poorer because we are over-anxious to please the public. Please the public by all means, but insist that what rightly belongs to the industry remains in the industry, and is not freely poured into outside pockets. The trade discount should be reserved wholly and exclusively for those engaged in the trade.

The foregoing may, perhaps, be described as the contractor's viewpoint without regard to what is expected of him and to the increasing obligations which he owes to the industry. He has very definite obligations, and I venture to suggest to him the necessity of greater effort.

Mr. L. C. Penwill succeeded the late Mr. L. G. Tate, whose assistant he was, as general secretary of the E.C.A. in 1926. (*Photograph by H. J. Whitlock & Sons.*)

Salesmanship

To-day, the electrical industry has such a variety of products of every-day industrial and domestic utility that we must concentrate upon our ability to demonstrate and sell. Salesmanship is a vital necessity, and just as the large departmental stores find that trained salesmen are an indispensable aid, we must equally realise it and act accordingly. Although I well remember it being said that a showroom and expensive shop display do not pay, I know of several contractors who quite recently have had the courage to try the experiment and are well satisfied with the result.

If contractors and retailers do not equip themselves for the public demand, others will do the business and we shall have ourselves to blame for losing it. A fundamental of trade is that the man buying for genuine re-sale is entitled to do so at trade terms.

National Trading Register

When the fundamental principles of trading within the industry as laid down by Committee "D" have been adopted, the time will be opportune to draw up a more detailed code which will have for its aim a more simplified system of trading and a fairer division of the reward for services rendered.

This simplified trading, I am convinced, lies in the preparation and operation of a National Trading Register, which should set forward definitely buyers under varying categories and the terms to which they are entitled. Those who say that the idea is impracticable I should refer to the E.L.M.A. Register. Adverse criticism of this scheme is entirely due to the fact that it is specialised. If, instead of the E.L.M.A. Register being the work of only one section of the industry, the resources of all sections were used in its preparation, it would present an achievement which would be of untold benefit and would solve a tremendous number of the problems with which we are confronted.

Reduced trade discount, despite the reluctance of contractors to accept a lower reward for their services, I believe would in itself be productive of very far-reaching and satisfactory results. It would remove a good deal of the temptation which at present exists to buyers (for their own use) to try by all sorts of ingenious means to secure "a something" which does not belong to them. Coincidental must be inaugurated a further basis under two distinct headings:—

(*a*) Quantity discounts, which must be of considerable advantage to the manufacturer, whose average overhead charge would be materially reduced.

(*b*) Showroom discount, some definite encouragement to the retailer who stocks, displays, and demonstrates, so rendering a greater service than the contractor who simply buys as and when his client orders.

The suggestion of a reduced trade discount is one which must be made with all necessary reservations. I appreciate that the matter has not been investigated sufficiently for a definite opinion to be expressed. The principle might be acceptable in connection with certain apparatus, but totally impracticable with others. In any case, however, I put it forward purely as a matter for future consideration and only upon the definite conditions stated, namely, the introduction of "quantity" and "showroom" discounts.

Close of the I.M.E.A. Convention

Reported by Our Representative

THURSDAY, June 17th, was the last full day of the Scarborough Convention. In the first place it was Women's Day (following the precedent of the last few years), and the number of visitors was swelled by the presence of leading members of the Electrical Association for Women who had travelled to Scarborough especially. The functions included luncheon at the Royal Hotel, a visit to the exhibition, and tea (kindly provided by the Scarborough Electricity Committee). At the luncheon, which was attended by the Mayor and Mayoress of Scarborough, short speeches were made by Lady Moir, O.B.E. (president E.A.W.), Mr. A. J. Fuller, and the Mayor. Two papers were read (by Mr. A. Nichols Moore in the morning and by Mr. C. W. Sully in the afternoon) which provided stimulating discussions, in both of which the president of the I.E.E., Mr. C. C. Paterson (who had motored over from Sheffield before breakfast) took part.

The annual dinner with the following dance provided a fitting climax to what was undoubtedly a most successful and thoroughly enjoyable convention. The Rt. Hon. Herbert Morrison spoke at the dinner, and afterwards I had occasion to observe that efficiency and energy as a Cabinet Minister is very far from being incompatible with the possession of delightful human qualities.

Lady Moir made a graceful reference in her after-dinner speech to the support given the E.A.W. by the electrical Press; this support is, of course, based upon the sincere conviction that the E.A.W. is a vital part of the industry, as I subsequently had an opportunity of mentioning to her.

A reference should be made to the interesting brochure presented by the E.L.M.A. to the delegates, and also to the electrical display vans that were noticeably in evidence during the convention. Those I saw about the streets were the Scarborough Corporation, Reyrolle-Holmes, Sun-Ray Tricity, Crompton-Parkinson, Berry's Electric, and G.E.C., Ltd., vehicles. They provided very fine examples of traction engineering, but I still hope to live to attend a Convention at which such vehicles will be electrically propelled.

Mr. C. G. Morley New (a sketch of whose career was given in the ELECTRICAL REVIEW last week) is to be congratulated on his election as president for the coming year.

Presentation to Mr. A. C. Cramb

Alderman W. WALKER (Manchester) proposed the following resolution, which was passed:—"That this Association accepts with sincere regret the resignation of Mr. A. C. Cramb as honorary secretary consequent upon his appointment as Director and Secretary of the British Electrical Development Association, and places on record its high appreciation of the eminent and valuable services rendered by him to the Association during his 31 years' membership and more particularly during the past 11 years when he held the position of honorary secretary."

The PRESIDENT then presented Mr. Cramb with a gold watch and a cheque, and Mrs. Cramb with a trinket set.

MR. A. C. CRAMB, acknowledging the presentations, said that the reason why he accepted his new position, which was offered to him quite unexpectedly, was that he felt he could work in a wider sphere than in the past, but with the same objects in view.

The annual report of the Council, which was adopted, contained the usual exhaustive review of the year's work.

Annual Dinner

At the annual dinner at the Grand Hotel, owing to the limited accommodation, it was only possible to seat some 250 members and guests. The guest of the evening was the Right Hon. Herbert Morrison, M.P. (Minister of Transport), and among those present were Sir Andrew Duncan (chairman, Central Electricity Board), Sir Archibald Page, chief engineer, Central Electricity Board), Mr. T. P. Wilmshurst (Electricity Commissioner), Mr. Ll. B. Atkinson (president, E.D.A.), Mr. C. C. Paterson (president, Institution of Electrical Engineers), Mr. V. Watlington (president, B.E.A.M.A.), Lady Moir (president, Electrical Association for Women), Alderman J. W. Butler (Mayor of Scarborough), Councillor A. Moore (Chairman, Scarborough Electricity Committee), Councillor W. A. White (chairman, Fulham Electricity Committee); Mr. A. J. Fuller (the president) was in the chair.

After the toast of "The King," MR. HERBERT MORRISON, proposing "The I.M.E.A.," referred to the important service rendered, not only to local authorities but to the State also, by such national associations as the I.M.E.A.; they enabled H.M. Ministers to discuss common problems of the industry with representative bodies instead of being faced with the impossible task of individual negotiation. Despite the trade depression, electricity supply continued to make progress. During the first quarter of the year the energy generated in Great Britain increased by 5 per cent., whereas both America and Germany had to report adverse figures. Between three-fifths and two-thirds of the supply industry was managed by public authorities, the energy generated by them having grown from 3,910 million to 6,383 million kWh during the last five years, the latest figure representing over 61 per cent. of the total generated by authorised undertakers in Great Britain. The sales and service department should not be regarded as a subordinate, but one of the most vital departments, and the customer should be shown how his electricity bill could be reduced, because in the long run that was the way to keep net receipts up. His advice to the local authorities was: "Do not let yourselves be outstripped by private enterprise by insistence upon rigid municipal distribution areas; you must go outside, even if it does not pay you to do so immediately."

The PRESIDENT, responding to the toast, said he was a great believer in appointing the highest possible grade of man as sales engineer. The I.M.E.A. had now 280 municipal authority members, which was some 80 per cent. of the whole of the municipal electrical authorities in the country. In these days of "piracy" on the part of large power companies and even large municipalities there was need for an Association to look after the smaller authorities.

Lt.-Col. H. W. Watts, Messrs. F. Newey, J. K. Brydges, and A. W. Barham

Four Members of Council

The remaining toasts were "The Metropolitan Borough of Fulham and the Borough of Scarborough," proposed by Alderman R. Richardson (deputy Lord Mayor of Hull) and responded to by Councillor W. A. White (chairman of the Fulham Electricity Committee) and the Mayor of Scarborough (Alderman J. W. Butler); and "Our Guests and Ladies," proposed by Mr. C. G. Morley New (president-elect) and responded to by Lady Moir (president), Electrical Association for Women).

Annual General Meeting

The annual general meeting was, as usual, private. The result of the ballot for the election of officers and members of Council was as follows:—President: Mr. C. G. Morley New (Cardiff). Vice-president: Mr. Geoffrey Porter (Worthing). Hon. solicitor: Mr. J. H. Rothwell (Brighton). Hon. treasurer: Mr. A. Nichols Moore (Newport, Mon.). Hon. secretary: Mr. W. C. P. Tapper (Stepney).

Members of Council: Large undertakings—Mr. H. C. Lamb (Manchester), Mr. A. W. Blake (Willesden), Mr. E. Seddon (Edinburgh), Mr. J. Mould Leicester). Small undertakings—Mr. A. J. Hutchinson (Farnworth). Committee representatives: Alderman H. B. Vorley (Islington), Alderman J. Beaumont (St. Marylebone).

A cordial invitation to hold next year's Convention in Cardiff was extended to the Association by Alderman Gough, chairman of the Cardiff Electricity Committee.

Discussion on the Lighting Load

"The Value of the Lighting Load to Authorised Undertakings" was the subject of Mr. C. W. Sully's paper, which will be found on p. 1030 of our June 19th issue.

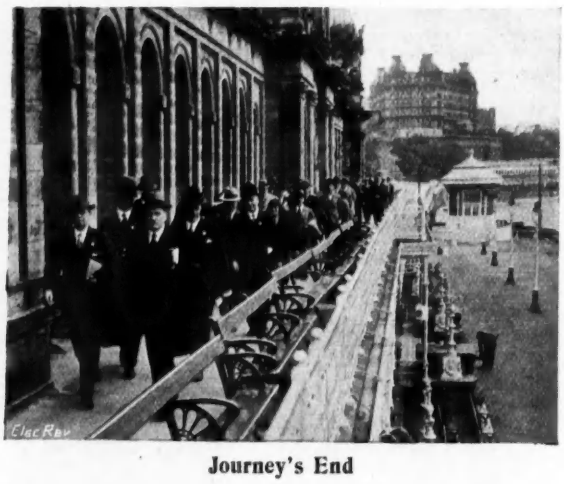
MR. T. P. WILMSHURST (Electricity Commissioner) opened the discussion by referring to the great improvement in the efficiency of the incandescent electric lamp. He would have very much liked to say something about the price of lamps, but understood that subject was taboo. The foresight shown in pressing for a standard of 230/400 volts had been responsible for the great development in domestic heating and cooking.

MR. C. C. PATERSON (president, Institution of Electrical Engineers) said there was no branch in which technical advice and guidance were so necessary as in street lighting. The International Congress would afford an excellent opportunity of showing what could be done.

MR. C. W. SALT (Carlisle) considered it the duty of electricity undertakings to light all the streets in their areas, even though

the rateable value of the property might be as low as £8 per annum. His experience was that the lighting of the lowest value property provided a revenue of an average of £2 per annum, or 9d. per week, only and if this revenue was to be increased then the use of electricity for other purposes must be increased. The average consumption for lighting was about 80 kWh per annum, taken over 4,000 houses, but in the case of 2,500 small consumers taking supplies on a two-part tariff of 15 per cent. rateable value and ½d. per kWh, the consumption averaged nearly 1,000 kWh per annum and provided an annual revenue of £6. Lighting was of great introductory value to the use of electricity for other purposes in the small house, but too much concentration upon lighting, by reason of the poor load factor, would not assist in arriving at the desired goal, *viz.*, a cheap and abundant supply of electricity.

MR. A. C. CRAMB (director, Electrical Development Association) expressed the view that so much attention had been



Journey's End

given to " other " uses of electricity during the past few years that the value of the lighting load had been somewhat overlooked. The men who were to get the lighting business, however, must really understand illumination and be able to advise. They must remember that, instead of selling an article, they were selling service.

ALDERMAN W. HEBDEN (Shoreditch) urged the extension of street lighting with a high degree of illumination, even in the poorest districts.

MR. A. W. BLAKE (Willesden) commented on the fact that this country was 25 years ahead of the Germans in domestic electrification, who were, however, well abreast of us in the use of industrial power. Whilst there was a tremendous field for lighting, he was inclined to doubt its benefit on account of its poor load factor.

MR. L. L. ROBINSON (Hackney) said the paper contained many cleverly prepared statistics to make them believe they were getting good value for their money in the lamps bought to-day. Were they not going too far in the struggle for efficiency? As electrical energy was getting so cheap, the efficiency of the lamp mattered less and the cost of renewals more. Did load factor matter so long as the price obtained covered cost and profit for each kWh? For business stability they must have all classes of load, each sold at a price proportional to cost. The I.M.E.A. should get into touch with the Ministry of Transport to see if street lighting could be helped from the Road Fund.

MR. W. F. T. PINKNEY (Newcastle-upon-Tyne Electric Supply Co.) pointed out that a 4 per cent. increase in pressure was sufficient to reduce the life of modern lamps by one half. That variation in pressure was permitted by the regulations and he hoped research would produce a lamp which would not be halved in its life if the regulations were adhered to. The advantage of developing the general load had been shown in his own undertaking.

MR. A. NICHOLS MOORE (Newport, Mon.) said that whilst street lighting might have a load factor of 50 per cent., it did not bring in the best price. Therefore they should not make too much of a song about it.

The AUTHOR, replying, said the real point was that as the amount of lighting increased the load factor improved. The loads which followed from the use of lighting demonstrated the importance of developing the lighting load.

Discussion on Distribution

The paper on the " Future Development of Electricity Distribution in Great Britain," by Mr. A. Nichols Moore, will be found on p. 1031 of our June 19th issue.

ALDERMAN H. B. VORLEY (Islington), as a member of the London and Home Counties Joint Electricity Authority, felt that a good deal could be done by such authorities in securing the amalgamation of small authorities without necessarily going to the extent of National Regional Distribution Boards.

MR. H. C. LAMB (Manchester) said that although the author pointed out some of the defects of municipal management, on the whole the system had worked very much better than it might have been expected to, and, by comparison with companies, had nothing whatever to fear. He would be a dogmatic person who contended that the present system would be perpetuated, but, in spite of the anomalies which existed, it would be a considerable time before it was overthrown. Regional Distribution Boards would mean complete divorce between generation and distribution, which had never been tried in any other country, and the whole basis of the 1926 Act would have to be revised before it could even be tried. Another flaw was the suggestion for unified charges; they might as well apply it to everything and adopt communism at once. If the author intended his scheme as a counter-blast to the Russian Five-Year Plan, it need not be treated too seriously.

MR. W. M. SELVEY (consultant) said that powers equivalent to those of the suggested Regional Distribution Boards had in actual practice recently been conferred upon the large power companies, and certain Corporations had also considerable areas for development. Boiling the whole matter down, was it necessary to create a new organisation entirely to clean up the small corners not reachable by the present broom, or would the vacuum cleaner gradually draw them into the existing organisation? As regarded the companies he felt that it would, but as regarded local authorities his answer was " no." If it were essential to do so, then the scheme outlined by the author must come about in some form or other.

MR. F. W. PURSE (London and Home Counties Joint Electricity Authority) said that in broad outline he subscribed generally to the general principles of Regional Distribution Boards. Public opinion was behind movements of that kind and unless supply authorities took advantage of the opportunities they now had of co-operating and unifying distribution in large areas a scheme of the character outlined by the author would be forced upon them. It was lack of desire for co-operation which caused the 1919 Electricity (Supply) Act to be foisted upon the industry because progress was not being made on voluntary lines. Therefore he urged the industry to take advantage of the opportunities it still had to retain control by further extension of the number of Joint Electricity Authorities and further use of the powers now available. If this were not done he would be inclined to prophesy that in five years the I.M.E.A. would be non-existent.

MR. C. C. PATERSON (president, Institution of Electrical Engineers), who was given a hearty welcome, expressed his appreciation at being asked to attend the Conference.

MISS C. HASLETT (director, Electrical Association for Women) expressed the women's point of view that the only test of the value of National Distribution Boards was whether they would result in the price of electricity being lower. Greater uniformity in price for domestic purposes would have a wonderful national effect.

LIEUT.-COL. W. A. VIGNOLES (Messrs. Evershed & Vignoles, Ltd.) said that personally he looked with some alarm at the suggestion that they should have another national authority. Was it possible to hope that any National Board could serve consumers better than was being done in the great majority of places to-day? He hesitated to think so. The very large cost incurred in the establishment of such an organisation and considerable overhead charges would ultimately have to be borne by the consumer. The operations of the Central Elec

The Mayor with Members of the E.A.W.

tricity Board were not likely to benefit very greatly the big industrial areas and he felt that the scheme outlined in the paper could not do so either. It was not generally realised that 75 per cent. of the population in the areas where electricity was being supplied could now obtain it on a two-part tariff with a running charge of 1d. per kWh, or less, and he was not at all sure that a Central Distribution Board could do very much better.

MR. A. NICHOLS MOORE, in a very brief reply, suggested that Mr. Lamb's argument was weak, because the great claim for municipal development was that the members of the Committees had no financial interest in the undertaking and therefore could deal with the business in an entirely unprejudiced manner. In 80 per cent. of the present areas generation and distribution would be divorced under the Central Electricity Board's scheme. By uniform equated price he meant grid price in each regional area.

End of Heater Bank

A Thermal-storage Installation

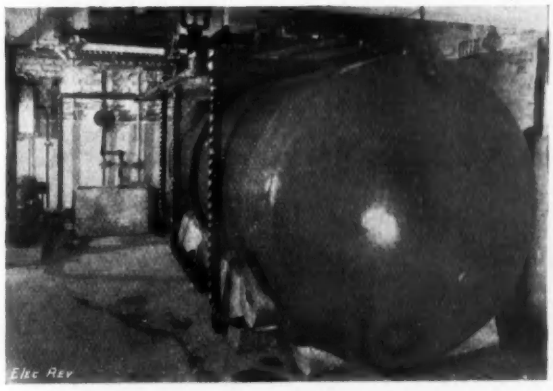
Electric Heating in Rochdale Corporation Electricity Offices

THE new offices of the Rochdale Corporation electricity undertaking have been equipped with a thermal - storage heating installation. The volume of building to be heated is approximately 105,000 cu. ft., and the installation is capable of producing and maintaining a temperature inside of 60 deg. F. when the outside temperature is 30 deg. F. The complete equipment was installed by Henry Tattersall, Ltd., the storage tank, with its electric immersion heaters, being supplied by A. Reyrolle and Co., Ltd. To suit the arrangement of the office building the storage cylinder, which is 15 ft. long and 5 ft. 9 in. in diameter, and has a capacity of 2,400 gal., was made in two sections, which were taken separately into the building, and there bolted together. The tank is fitted with flow and return connections, a safety valve, a drain valve, a thermostat pocket, and manholes, and is designed to withstand a working pressure head of 50 ft.

Tubular-type immersion heaters are fitted directly into the tank in three 30-kW banks, each bank consisting of nine 3.3-kW heater tubes mounted on a circular flange-plate with their connections brought out to terminals on a set of four circular bus-bars. The supply is 3-phase, 4-wire, 400/230 volts, 50 cycles. Three of the bus-bars are connected to the phases, and the fourth, which forms a star point, to the neutral, so that the load is equally divided between the three phases.

The supply to the heaters is controlled by a 3-pole, 200-A air-break switch and fuse mounted in a totally-enclosed, metal-clad panel, the outgoing terminals of which are connected to an automatic contactor of 150-A capacity. Power is switched on automatically at 6 p.m. by the contactor, working in conjunction with a time switch, and off again every morning at 6 o'clock. During this night period the equipment is capable of generating and storing sufficient heat to give an output of 300,000 B.th.u. per hour from 5 a.m. until 5 p.m. The contactor is also fitted with an auxiliary relay coil, which is connected to the thermostat in the storage cylinder, and is arranged to cut off the supply during the night should the temperature in the tank exceed 250 deg. F., and to switch it on again as soon as the temperature falls below 240 deg. F.

The water is circulated through the building by means of a Holden & Brooke "Selfix" circulating pump, and the flow temperature is maintained at 180 deg. F. by means of a Drayton automatic mixing valve. The equipment is working quite satisfactorily.



Thermal-storage Cylinder and Pump

Scottish Contractors' Meeting

ON Friday, June 12th, a large number of the members of the Electrical Contractors' Association of Scotland assembled at Taymouth Castle, Perthshire, for their second annual conference. They were received by the President, Mr. D. H. Morris, of Dundee, and Mrs. Morris upon their arrival.

In opening the meeting, after luncheon, Mr. Morris mentioned the great loss suffered by the Association by the untimely death of Mr. John Johnston Foggo, a former president.

The nineteenth annual report was submitted by the President, who referred to the satisfactory trading relationship which existed between the Association and the various manufacturing firms. He made reference to the recently-constituted Area Committee for Scotland of the Electrical Development Association, and said that not only would it do much by well-thought-out publicity to extend the industry, but it would also tend to help each section of the industry to realise the difficulties met with by the other sections.

Mr. Morris reported on the conference which had taken place with the chairman of the Executive Committee of the National Register of Electrical Installation Contractors, and he urged every member who had not yet registered to do so in the hope that the Register would accomplish its objects. He thought that a Scottish section of the Register would strengthen its appeal to Scottish contractors.

The adoption of the report was seconded by Mr. John L. Anderson, of Aberdeen, and unanimously agreed to.

After business connected with the various trading agreements had been dealt with, the following elections were made for the ensuing year: President, Mr. Henry Meighan, Glasgow; vice-president, Mr. J. L. Anderson, Aberdeen; secretary, Mr. W. Finlay, Edinburgh.

At the second sitting of the conference, Mr. Meighan, the new president, opened the conference with a paper on "Propaganda and the Extension of the Influence of the Association." After giving a brief history of the Association, Mr. Meighan expressed the opinion that the time was ripe for a considerable extension in the membership owing to a large number of new businesses set up, more particularly in the remote districts where electricity supplies had just been made available. It was the duty of the Association to bring before these new enterprises the necessity of combination and organisation, and he felt that a systematic propaganda programme should be prepared to set forth the claims and advantages of the Association.

A second paper was read by Mr. James Allan, of Glasgow, his subject being "A Fair Trading Policy." He spoke of the large amount of work that had been done by the Fair Trading Committee of the Association, and expressed the hope that the policy which had been drafted by a representative conference of all the varied interests in the industry would be seriously considered and adopted, not only by the members of the Association, but by every other section of the industry. The policy provided for the setting up of a central authority on which all participating associations would be equally represented, and also for area advisory committees to administer the policy. The draft policy, on being considered in detail by the members present, received unanimous approval.

Mr. Morris concluded the conference with a short paper, entitled "The Grid—the Contractor's Opportunity," and drew the attention of members to the much wider area throughout Scotland that was now available to them as a possible source of business.

The social side of the conference was again well provided for, among the numerous amusing features being a golf match between the East and West, a fishing expedition, and an evening cruise on Loch Tay.

The Scottish Electrical Contractors' Conference, 1931

Questionable Practice. By "Ubique"

The Unfair Treatment Occasionally Accorded to Electrical Contractors

MATTERS in the electrical contracting business are not altogether what they should be. There is too much work being done for which it is known there will be no return. Many large firms throw away thousands of pounds each year merely to maintain their goodwill.

We will assume that a large hotel or theatre is being constructed. Constructional plans are prepared by the architects concerned and, in due course, the subject of lighting the interior comes up for consideration. Now, the architect knows practically nothing about the art of illuminating engineering; he merely knows what effects he requires, and he may have a hazy notion as to how they will be produced. That is all.

The chief desire of the architect is that the installation shall be original; that is, the lighting units must be of special design. Since he knows nothing about the design of lighting equipment, especially when it is to produce certain effects, he does the only reasonable thing he can do; he calls for the services of manufacturers of lighting equipment, knowing that they have expert illuminating engineers on their staffs.

"Estimates Free"

He writes to three or four, and in some cases six, firms and briefly outlines his requirements, asking for original designs so far as the lighting units are concerned and requesting details of an installation. Furthermore, he suggests that alternative designs and schemes shall be submitted. He now considers that he has done his part and he waits for others to do theirs.

The illuminating engineering staffs of half-a-dozen firms start working on his behalf. Line and wash drawings are prepared by specialists in this class of work, and the illuminating engineers are hard at work on lighting designs. Each firm that has been invited to submit designs knows who are the other people working on the same job. Competition is keen merely because the firms are compelled to continue with the work; many of them would, if they could, gladly give up the job, but this would mean loss of prestige in other directions. And the work produced is of the best. It cannot be scamped because the reputation of the respective firms is at stake; yet it is known that only one—or even none—of them will be instructed to supply the fittings designed and to complete the installation.

I have known several firms to employ half-a-dozen men each, on designs of this character, over a period of two months and none of them has obtained the contract. When the installation has been completed it has been found that sections of various designs have been embodied in the lighting units. I have also known cases where complete designs have been scrapped and ordinary catalogue units adopted; and this after half-a-dozen firms have spent several hundreds of pounds on the job.

Architects as Designers

I have knowledge of more than one case where the architect responsible for the construction of a building has designed his own lighting units, and the result has never been satisfactory. One outstanding case was that of a theatre in which shallow ceiling units were to be "the finishing touch" of an extensive decorative scheme. Many dozens of colour-sprayed lamps were accommodated in each unit. The shape of the units, however, did not permit the lamps to be correctly fitted, the result being a mottled effect which shrieked at one immediately one entered the theatre. This was, indeed, attractiveness without charm. Even the architect concerned admitted that his designs were wrong, but it was the firm that supplied the lamps which got the kicks. And they had to submit without protest; architects are powerful people who can sway contracts either one way or the other.

But it is not only the large installation firms who are victimised in this way. Often small wiring contractors have to put in a lot of time, and spend sums of money, without any prospect of return in the way of contracts. I will quote one of many cases which have come within my experience.

Sharing the Spoils

"A" is a retailer who sells anything electrical; he usually deals in bells, batteries, lamps, and wireless sets; "B" is a large firm with a wiring and supplies section; "C" is an electrical contractor who carries out contracts for "B"; and "D" is an independent wiring contractor. "A" has no electrical staff of his own, yet he never turns a job down. He is out to turn every inquiry to account.

The game commences when "A" approaches "B" with the information that he has had an inquiry about the lighting of a building; in the case to which I am referring it was a church. "A" wishes to submit designs and estimates to his "customer" for a complete lighting installation; all he wants from "B" is a certain percentage commission which can be arranged from the trade discount upon the material purchased.

"B" then approaches "C" and asks for an estimate for the job. But "B" cannot trust "C" entirely, so he tells him that he is going to obtain an independent estimate; "B," accordingly, invites "D" to estimate for the same job. When the estimates are handed in to "B" they are compared. If "D's" is lower than that of "C," then "C" is asked to reduce his figure. The complete estimate is then handed to "A" who approaches his customer with the assurance that the lowest possible figure has been obtained.

When the work has been completed the result is as follows: "B" has sold a certain quantity of conduit, wire, lamps, and fittings; "C" has installed the material and made profit on labour and material; "A" has received his discount and is becoming known as an electrical contractor; and "D" gets nothing. I am in favour of obtaining competitive estimates on any reasonable job, but I do not think that they should be obtained when it is known that the best tender will not receive the contract.

Wasted Labour

Large firms sometimes take advantage of wiring contractors, and both are put to a lot of trouble and expense, when it is known that neither may benefit at all. Let me quote a case to illustrate this.

A firm in Hong Kong require estimates for the lighting of a number of benzine stores. They approach the representative of a firm of lamp manufacturers in England knowing that they have illuminating engineers who will give advice regarding the height and spacing of the various units. It is hinted that, if the estimates are satisfactory, orders will be given to the local representative for lamps, reflectors, &c.

The result is that the export department of the firm in England receives an inquiry for estimates for the lighting of the stores in Hong Kong. Nothing but the dimensions and height of each store are given, with the information that c.t.s cable must be used, in conjunction with gastight fittings, all switches to be fitted outside the stores.

The illuminating engineering department of the firm gets busy. Lighting designs are got out, with proper heights and spacings for certain sized units; fuseboard and switchboard capacities are also given, together with the capacities of the various cables to be installed. But the firm does not manufacture c.t.s. cable, and having no experience it has no records of either material or labour costs. It therefore sends the designs to an electrical contractor with a request for an estimate for the work. The contractor assumes that the work is to be carried out in England and he bases his estimates accordingly. He works on the job for a few weeks, calculating lengths of cable, the number of junction boxes, &c., and in due course the estimate is returned complete. After copying, it is sent on to Hong Kong.

The Hong Kong people then give the contract for wiring to a local contractor, after comparing his estimate with the one sent from England. It is possible that the cable and fittings may be purchased from England, and the local representative may receive orders for lamps and gastight units, but I have known cases where the whole of the material, including lamps, has been purchased from America. In both cases the electrical contractor in England gets nothing, and this, to my way of thinking, is not fair.

Yet the conditions can hardly be altered. It appears to be a matter of give and take; that is, sometimes the electrical contractor gets something put in his way which, otherwise, he would not have received. So, after all, it may be as well to be thankful for small mercies.

Electrical Appliance Depreciation Allowances

The report of the Institute of Municipal Treasurers and Accountants, presented at the recent annual conference at Brighton, mentioned that further negotiations had taken place between the Board of Inland Revenue and representatives of the Incorporated Municipal Electrical Association and the Institute with regard to wear-and-tear allowances in respect of electrical apparatus let out on hire. The Institute expressed the hope that the Board would agree to grant a depreciation allowance. The Board of Inland Revenue had recently intimated that it could not allow the inclusion of expenditure necessitated by a change of system, frequency or voltage in calculating profits for income tax purposes but it was in normal circumstances willing to grant an obsolescence allowance in respect of replaced assets and a wear-and-tear allowance on the new assets. The Institute considered the arrangement a reasonable one.

The E.H.P. Conference

Discussions in Paris on alternators, insulating material, transformers, d.c. transmission, oils and switchgear

(FROM OUR SPECIAL COMMISSIONER)

THE sixth biennial meeting of the E.H.P. Conference was opened on June 18th by the Minister of Public Works in the Salle Coche, Paris, where the last three meetings have taken place.

MR. M. ULRICH, in his reply to the Minister's brief speech of welcome, drew attention to the fact that this was the tenth anniversary of the foundation of the Conference. In 1921 the meetings were attended by some 200 delegates, of whom only 50 came from some half-a-dozen foreign countries. The attendance at the meetings has steadily increased, and this year, even at the opening date, there are 750 delegates from 35 different countries.

Passing the last decade in review, the president showed how a number of questions which were brought up at the earlier meetings, and put on one side as airy flights of imagination worthy of Jules Verne, were now actually accomplished facts. In spite of the present depression the electrical industry was still making great strides in development.

It is most remarkable how the E.H.P. Conference settles down on its first day. Once the formal opening meeting is over there is nothing to show that the organisation is not of a permanent nature, and all the various component parts seem to fall together right from the outset, creating an atmosphere of ease which would do justice to a small informal meeting and which for ten years has been the most striking and pleasant feature of the E.H.P. meetings.

The Design of Alternators

The first morning was taken up with a discussion relating to the design of alternators, and incidentally the subject of boilers was also referred to. In fact, boilers, properly speaking, are not included in the programme of the Conference, but there is one aspect which touches the overall efficiency of the power station to which attention has been called. The increases in pressure and superheat have made the manufacture of much larger units possible. In some cases, particularly those where the stations are relatively small, the use of these pressures would be economical if uses could be found for by-product steam from the low-pressure end of the turbines.

Many attempts at town heating from power station back-pressure steam have been made with varying degrees of success. Customers have been offered not only a supply of electricity but also a supply of steam for their industrial processes, but apart from one or two special cases this method has not been a success. Technically no difficulties have been encountered; the great problem is that of finding a steady market for the steam produced. Examples of successful operation were cited where varying forms of steam accumulators are used. Much more development will be required before this system can become by any means general.

With regard to alternators, the main points brought out appear to be the outcome of the ever-increasing outputs and the tendency to use higher-voltage windings. In general it cannot be said that these increases have introduced any new problems in design, but they have certainly made the old problems much more acute.

It most definitely appears that the electrical designer is well ahead of metallurgical products. This, of course, applies more particularly to high-speed rotor materials.

Rotor peripheral speeds of 173 meters per second were mentioned as compared to the generally accepted maximum of 145, but in spite of the assertion that even with this speed the factor of safety remained the same, the meeting remained sceptical. These high figures appear to be obtainable only with certain molybdenum steels, which are looked upon by the majority of those taking part in the discussions with a great deal of suspicion.

Perhaps the most interesting part of the discussion was centred upon the question of the measurement of losses in large machines. With increasing outputs designers require to obtain a higher specific use of the materials at their disposal, and as a consequence must obtain very close measurements of the losses. The separate loss system has received a great deal of criticism by both Continental and British designers. With modern large output machines in the majority of cases closed-circuit ventilation is used with either air or hydrogen. The question of the measurement of loss by means of measuring the rise in temperature of the cooling medium has now been perfected and is found to give very satisfactory results where the losses can be measured within 5 per cent.

The greater part of the criticism against this method comes from the operating engineer who has not got the same facilities for measuring the flow of cooling gasses as the manufacturer. He is again handicapped by the greater difficulty in running such large machines as synchronous motors for test, but designers appear to have reached some measure of agreement as to the method which may still be subject to perfection in detail.

Fabricated Structures

There seems to be general agreement that fabricated electrically welded structures offer very many advantages over the older type.

In France alone the electrical industry has produced some 800,000 kW of electrically welded machines which have given no trouble whatever. Great importance is attached to this method in the production of rotating parts subject to overspeed stresses; it is contended that the use of castings or large forgings, which may contain defects that the most perfected systems of scientific inspection may not reveal, is not so secure as the use of rolled sections and plates.

Attempts have been made to compare prices of welded machines and those of the older types, but it was very justly pointed out by several speakers during the discussion that the greatest care must be exercised in making comparisons of machines which are made of materials whose market fluctuations may not necessarily run in parallel.

Classification of Dielectrics

The afternoon's proceedings were devoted first to insulating materials. The discussion was introduced by MR. DREWNOWSKY (Poland), chairman of the International Advisory Committee which was set up at the 1927 meeting, and whose present report is a continuation of its 1927 and 1929 reports. It is a very exhaustive and complete document dealing mainly with the classification of dielectrics, and certainly should find a place amongst the works of reference of anybody using insulating material. It will eventually find its way to the International Electrotechnical Commission and will probably emerge from there in the form of recommendations with but few changes.

The chairman of the committee appealed to those interested to collaborate with the committee in order that the work might be in every way fully representative.

A most interesting contribution to the discussion was made by MR. E. B. WEDMORE, director and secretary of E.R.A., which is already working in full collaboration with the committee. The report contains three systems of classification and suggests that the committee should choose one of these systems in order to condense the work. Mr. Wedmore, however, would prefer to see the three systems retained and expanded, as in the present state of our knowledge of the characteristics of insulating materials, condensing the work would be dangerous as it might be found later that certain steps had been omitted. The one important thing to bear in mind with work of such a scope was that each step should be complete so that it should be unnecessary to go back over ground that had been covered. These remarks apply in particular to synthetic compounds, which as a class alone would probably give enough work to a given section of the committee until the next session.

Subject to ratification by the Conference it is proposed to continue the work on standard specifications for insulating materials, and to carry out a detailed investigation into the classification of synthetic insulating materials of organic origin.

Transformer Developments

The next subject under review was that of transformers, the different contributions to which were grouped together in a summarised report prepared by MR. S. A. STIGANT. Unfortunately the author himself was unable to present in person his most able report, and the discussion suffered accordingly.

The one outstanding feature in connection with power transformers is the question of arranging within the transformer itself shunted capacities for protecting the windings against surges by ensuring a linear distribution of surge potential along the length of the winding. Most of those who took part in the discussion were agreed that the method lent itself admirably to mathematical treatment and design on paper. In practice, however, constructional difficulties are such that the protection afforded by this means can be obtained only at the cost of greater sacrifices in other directions, principally in price.

MR. GOODLET pointed out that the idea had been put forward some ten years ago; to-day transformers are being designed to withstand satisfactorily the stresses set up by any surge that may be expected to occur in normal networks.

Instrument transformers aroused more discussion than power transformers. A new type of combined current and potential transformer was proposed and explained by MR. IMHOF. Numerous suggestions were made with the same object in view, the reduction of cost especially of potential transformers. The discussion wandered slightly, but was very ably handled by Mr. W. B. Woodhouse, whom we had the good fortune to have in the chair. Very briefly the whole question may be summarised as being an eternal compromise between accuracy and cost.

Some of the transformers described in detail, which will appear in the minutes of proceedings of the meeting, are

certainly most ingenious artifices for obtaining a quart out of a pint pot, but each must inevitably be considered on its merits, with due consideration to local conditions. It was made quite clear that there is abundant material of this type available for almost any conceivable set of conditions, including a unit type which can be built up from standard 30,000-volt units up to almost the highest voltages in use.

Although taken out of place, DR. RAYNER'S remarks are of interest at this juncture. Research work carried out at the N.P.L. in connection with dielectric losses have entailed very delicate tests of transformer calibration. The degree of precision to which the N.P.L. works is instructive to both Continental and British engineers. The errors cited were of the order of 1 in 10,000 in one test and one ten-thousandth of a radian even with power factors of from 1 to 5 per cent. With power factors of 1 per cent. an error of 1 per cent. is in reality an error of .0001 in the reading of the phase angle. These tests were carried out over a range of from 20,000 to 200,000 volts.

High-voltage D.C. Transmission

At the conclusion of this discussion an interesting communication was made on high voltage continuous current transmission by the use of thermionic valves.

MR. ALIBONE'S contribution to the discussion came as a surprise to most of those present. He informed the meeting that although high-voltage d.c. transmission might be regarded by many as a dream of the future, present progress in the production of high-power thermionic valves had reached such a point that his company had produced a 500-kW valve of this type. The vacuum is produced by oil pumps instead of mercury pumps, and it has been found possible to produce any desired degree of vacuum.

A subsequent speaker pointed out that the introduction of the valve would at least have the great advantage of creating agreement among electric traction engineers, whether exponents of d.c., single-phase, or any other system.

In closing the meeting, MR. WOODHOUSE recalled Lord Kelvin's remark that alternating current was an excellent thing for teaching engineers mathematics, and having achieved this object should be abandoned for ever.

Insulating Oils

Saturday's proceedings were opened with the special report presented by the Insulating Oils Committee under the chairmanship of MR. WEISS, who, incidentally, is in charge of the Petroleum School at Strassbourg.

The report embodies seven different papers, all of which are the outcome of two years work since the last report was presented. The 1931 report deals in particular with the question of deterioration of transformer oils in service, and some very remarkable results have been achieved by this committee.

The work of the committee as a whole has obviously been directed into its various channels by able leadership, and divides itself into three groups. (*a*) Pure laboratory work; (*b*) organised observation work in different parts of the world; (*c*) liaison work. The author somewhat modestly states that the last is that which has been carried out by himself, but his part and that played by the Petroleum School is quite obviously very much greater.

The papers summarised in this report cover almost every possible aspect of the study of the behaviour of oils in service. It is pre-eminently intended for the benefit of operating electrical engineers. It seems, however, that even the great oil companies, in spite of their own powerful research organisations, have much to learn from the committee's work, judged from the electrical users' point of view.

Some extraordinary phenomena have been discovered in connection with the behaviour and ageing of oils, some of which were wholly unsuspected, but results have been very consistent over six years' research work. For example, the mixture of different oils in transformers has been given very careful attention, and the economies of using new oil as make up for transformers has been thoroughly explored. The immediate practical outcome of this work is the effort to catalogue and classify different grades of oils according to their characteristics, uses, and origin.

During the course of the discussion the author pointed out the necessity of collaboration in this work. Already a number of supply companies and transformer owners are working in conjunction with the committee, but in order to make this work as valuable as possible it is necessary to widen its foundations. Organised observation work can be carried out with little or no cost, and would be amply repaid by the exchange with the committee of the valuable information gleaned from other sources. The ability to predetermine the useful life of any grade of oil or mixture of grades of oils with certainty must of necessity lead to economy in its use, and to the avoidance of breakdowns due to oil behaviour. This work is essentially a question of team work, and cannot be completed by a few individuals, however enthusiastic. One very extensive paper on operating conditions has been submitted in common by three separate supply companies who outside this question have no direct connection.

Circuit-breaker Design

The afternoon session dealt first with switchgear. As before, this very important question has been placed in the hands of an Advisory Committee under the guidance of MR. PERROCHET, who has presented reports on this subject to two former meetings. He may be congratulated on his achievement of his 1929 report on oil circuit breakers, which has subsequently been adopted by the International Electrotechnical Commission as its recommendations.

The one great point of discussion is rupturing capacity. The discussion which followed this report and that presented by MR. BAUER on switchgear resolved itself mainly into a question of responsibility of guarantee. The two great parties, manufacturers and operating engineers, indulged in a very frank and heart to heart exchange of views. The principle involved seems to be agreed by both sides, but the means to the end still requires classifying. Manufacturers contend that the onus of specifying the required rupturing capacity should logically be placed upon the shoulders of the operating engineer who should be in the best position to know the characteristics of his network at any given point. A practice has grown up of supplying the manufacturer with a list of machines, or sub-stations, &c., and leaving him to recommend a suitable switch. This has proved unsatisfactory in practice, as peculiarities of working conditions may be missed.

Again, the question of team work has been brought out in full. The response to the committee's inquiries has in some cases been exceedingly poor, although it is in the common interest, and in spite of the fact that the operating side is more strongly represented on the committee than the manufacturing side.

From the technical point of view the one outstanding feature is the great increase of contact opening speed. In spite of this increase of speed no trouble has been experienced with surges due to the rapid extinction of the arc.

Following this report some very interesting films and slides were shown by MR. W. H. CLOTHIER. One of his films illustrated a series of tests in his firm's special test house (ELECTRICAL REVIEW, May 30th, 1930) on three-phase switches equivalent to two million kVA at the instant of rupture. Of special interest was the fact that tests of this nature were being carried out in England upon a Continental switch in the presence of a delegation of manufacturers.

The day's proceedings closed with a report on sub-station practice, more particularly with regard to bus-bar layout. Increased amperages call for special precautions in the design of bus-bar support. Some interesting examples were shown.

The film shown a little earlier called for some comment from this point of view, for in order to obtain such great testing capacities, the bus-bars have to carry something of the order of 250,000 peak amperes. It is more than doubtful if any other type of construction than the metal-clad would have withstood the severe stresses imposed, not only mechanical but electrical.

The meeting closed with a discussion on American *versus* British practice, which covered a number of particular problems which can more properly be dealt with under selective protection in the third section.

The Delegates' Banquet

After the close of this meeting the foreign delegates forgathered at a banquet given in their honour by the Union des Syndicats de l'Electricité (somewhat equivalent to the B.E.A.M.A.). This banquet took place at the Union Interallie, whose building and gardens are in one of the most delightful spots in Paris. This banquet has been given at every session, but it is to be feared that if the rate of increase is maintained some structural alterations will have to be carried out to the building. This year some 300 guests were received as delegates from 35 different countries, and the function was attended with a greater success than ever. The speeches were few and to the point. The guests were welcomed by Mr. CAHEN, chairman of the Union, who briefly recalled the progress that had been made in electrotechnics during the last ten years. He was followed by MR. GEVAERT, Belgium, who pointed out the importance of the achievements not only from the electrotechnical point of view but from the electro-political point of view which had been brought into prominence by the exchange of electrical energy between nations.

The President of the Conference, MR. ULRICH, then thanked the Union in the name of the guests.

The formal proceedings were concluded by an eloquent speech delivered by MR. WOODHOUSE on behalf of the English-speaking nations. Mr. Woodhouse had the advantage of being one of the oldest British delegates, having been at the first meeting of the Conference in 1921. There was no doubt that he was fully voicing the feelings of the whole of the meeting when he referred with admiration not only to the work that struck the eye at the actual meetings, but at the invisible work that must be carried out in the intervals between meetings. Delegates had been accustomed to finding everything so well organised that improvement appeared impossible. Yet every second year the organisation was again improved. The speaker expressed his warm admiration for the superlative result that had been achieved by the general secretary, Mr. Tribot-Laspiere, and his staff.

Excursions have been arranged for Sunday, including a trip to Deauville, another to the Chateaux de le Loire, and a third to the hydro-electric power plant at Eguzon.

It should be noted in passing that this year's British delegation is in full force, consisting of some sixty members from varying interests throughout the country. The delegation does credit to the British National Committee under the ægis of the I.E.E., from whom any information in connection with the Conference or the minutes of proceedings may be obtained.

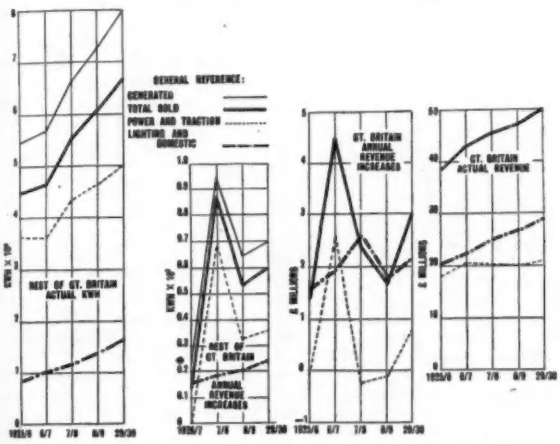
Supply Statistics. By R.H.S.

Comparison between development in London and provincial areas shows clearly the effect of the industrial power load

THIS article brings up to date and extends the scope of the figures published in the ELECTRICAL REVIEW of August 22nd and 29th, 1930. It also shows corresponding figures for the area covered by the London Joint Electricity Authority on the one hand and for the rest of the country on the other. These figures relate to authorised electricity supply undertakings in Great Britain except where marked "London" or "Rest of G.B."

Output of Authorised Undertakings

(*a*) From the statement issued by the Electricity Commissioners in May, 1931, it appears that the kWh generated



(millions) in Great Britain for the year ending with the month named moved as follows :—

	'25-6.	'26-7.	'27-8.	'28-9.	'29-30.	'30-31.
June ...	6,310	6,890	7,550	8,740	9,710	10,620
September	6,430	6,890	7,910	8,860	9,970	10,770
December	6,670	7,040	8,230	9,070	10,290	10,910
March ...	6,860	7,250	8,510	9,450	10,480	11,070
London	1,400	1,560	1,880	2,180	2,520	
Rest of G.B.	5,460	5,690	6,620	7,270	7,960	

(*b*) The increase in output each quarter compared with the corresponding quarter of the previous year was as follows (million kWh) :—

June	80	30	300	230	260	140
September ...	120	10	360	120	260	150
December ...	230	150	330	220	330	150
March	190	210	270	370	190	150
Total for year ...	630	390	1,260	940	1,040	590
London		160	320	290	340	
Rest of G.B. ...		230	930	650	700	

(*c*) The next table shows the actual output (million kWh) by authorised undertakers in each Central Electricity Board area in the years 1925/26 and 1929/30, and a comparison between the actual output for each scheme and the estimated output as shown in the "Supplementary Particulars" which supported the schemes.

Area.	Actual 1925-6.	Actual* 1929-30.	Increase as Per cent. of 1925-6 output.	Estimated 1929-30.	Variation on estimate. (+) Actual in excess. (−) Actual in deficit. Per cent. of estimated.
Scotland.					
Central ...	712	971	36	1,064	(−) 8½
England.					
South-East	1,624	2,980	84	2,660	(+) 12
Central ...	878	1,470	67	1,580	(−) 7
North-West	1,484	2,110	42	2,250	(−) 6
Mid-East ...	848	1,220	44	1,240	(−) 1½
North-East	700	905	29	888	(+) 2
South-West	483	742	54	800	(−) 7
East ...	39	63	62	75	(−) 16

* Central Electricity Board's Third Annual Report.

Sales to Final Consumers

Figures relating to sales and revenue are given in two groups; the first group covers supplies given mainly from low-voltage mains for domestic and commercial lighting, heating and cooking, and public lighting; the second group covers supplies of which a large proportion is given at voltages above 500 for industrial power and lighting and for railways and tramways.

(*a*) Millions of kWh sold to final consumers.

		'25-6.	'26-7.	'27-8.	'28-9	'29-30.
Lighting, domestic and public lighting.	Gt. Britain ...	1,330	1,540	1,820	2,160	2,490
	London ...	483	534	631	769	851
	Rest of G.B. ...	851	1,010	1,190	1,400	1,640
Power and traction.	Gt. Britain ...	4,270	4,330	5,180	5,640	6,180
	London ...	625	701	863	990	1,174
	Rest of G.B. ...	3,650	3,630	4,320	4,650	5,000
Total.	Gt. Britain ...	5,610	5,870	7,000	7,800	8,670
	London ...	1,108	1,234	1,494	1,758	2,025
	Rest of G.B. ...	4,500	4,630	5,510	6,040	6,640

For 1930/31 the total is estimated at 9,150 million kWh.

(*b*) The increases under each heading year by year for each area were as follows (millions kWh) :—

		'25-6.	'26-7.	'27-8.	'28-9	'29-30.
Lighting, domestic and public lighting.	Gt. Britain ...	210	210	280	340	330
	London ...		51	98	138	82
	Rest of G.B. ...		160	180	200	240
Power and traction.	Gt. Britain ...	300	60	850	460	540
	London ...		76	162	127	184
	Rest of G.B. ...		(−) 20	690	330	360
Total.	Gt. Britain ...	510	260	1,140	800	870
	London ...	143	127	259	265	266
	Rest of G.B. ...	370	140	880	530	600

For 1930/31 the total increase is estimated at 485 million kWh.

(*c*) The percentage increases in the number of kWh sold in 1929/30 for each purpose in each area compared with the corresponding sales in 1925/6 were as follows :—

kWh sold.	Gt. Britain.	London.	Rest of G.B.
Lighting, domestic and public lighting ...	87	76	92
Power and traction	45	88	37
Total	54	83	47

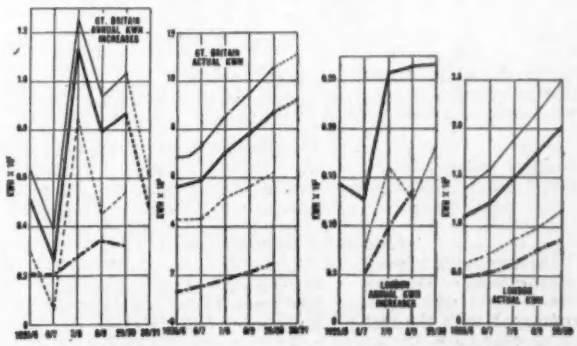
(*d*) The following figures indicate the percentage of increase in the consumption for lighting and domestic purposes outside London as compared with that for power and traction purposes :—

	Gt. Britain.		London.		Rest of G.B.	
	'25-6.	'29-30.	'25-6.	'29-30.	'25-6.	'29-30.
Lighting, domestic and public lighting ...	23.8	28.8	43.2	42.0	18.9	24.7
Power and traction ...	76.2	71.2	56.8	58.0	81.1	75.3
Total ...	100.0	100.0	100.0	100.0	100.0	100.0

(*e*) After making an allowance for energy purchased by authorised undertakers from non-statutory sources the number of kWh sold in each year as a percentage of the number of kWh originally generated in that year is found to have moved as follows :—

	'25-6.	'26-7.	'27-8	'28-9	'29-30.
Gt. Britain ...	80.7	80.7	81.1	81.5	81.5
London	79.2	79.1	79.1	80.7	80.3
Rest of G.B. ...	81.1	81.1	81.6	81.8	81.8

The lower efficiency in the London area is probably due to the fact that a greater proportion of the energy is sold from the low voltage systems and possibly to the use of a greater proportion of d.c. distribution.



Revenue from the Sale of Energy

		'25-6.	'26-7.	'27-8.	'28-9.	29-30.
		£ thousands.				
Lighting, domestic, and public lighting.	Gt. Britain	20,500	22,400	25,000	26,800	28,900
	London	7,710	8,030	8,910	9,560	9,830
	Rest of G.B.	12,800	14,400	16,100	17,300	19,100
Power and traction.	Gt. Britain	18,000	20,600	20,300	20,200	21,000
	London	3,460	3,870	4,100	3,990	4,380
	Rest of G.B.	14,500	16,700	16,200	16,200	16,600
Total.	Gt. Britain	38,500	43,000	45,300	47,000	49,000
	London	11,200	11,900	13,000	13,400	14,200
	Rest of G.B.	27,400	31,100	32,300	33,500	35,700

(*b*) The annual increases in revenue under each sub-head in each area were as follows:—

		£ thousands.			
Lighting, domestic, and public lighting.	Gt. Britain ...	1,900	2,600	1,800	2,200
	London ...	320	890	550	370
	Rest of G.B. ...	1,600	1,700	1,200	1,800
Power and traction.	Gt. Britain ...	2,600	(−) 300	(−) 100	800
	London ...	410	230	(−) 120	390
	Rest of G.B. ...	2,200	(−) 500	—	400
Total.	Gt. Britain ...	2,600	(−) 300	(−) 100	800
	London ...	700	1,100	400	800
	Rest of G.B. ...	3,800	1,200	1,200	2,200

(*c*) The percentage increases in the total revenue under each separate heading in the three area in 1929/30 as compared with 1925/6 were as follows:—

	Gt. Britain.	London.	Rest of G.B.
Lighting and domestic	41	26	49
Power and traction	18	27	14
Total	29	27	31

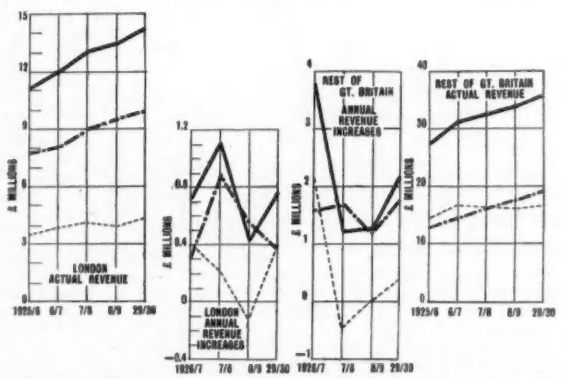
(*d*) The percentages of the total revenue obtained from the two groups of supplies in 1925/6 and 1929/30 moved with the percentages of kWh sold and were as follows:—

	Gt. Britain.		London.		Rest of G.B.	
	'25-6.	'29-30.	'25-6.	'29-30.	'25-6.	'29-30.
Lighting, domestic, and public lighting ...	53.3	58.0	69.0	69.5	47.0	53.7
Power and traction ...	46.7	42.0	31.0	30.5	53.0	46.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

(*e*) The average revenue in pence per kWh sold for each class of supply moved as follows:—

		'25-6.	'26-7.	'27-8.	'28-9.	'29-30.
Lighting, domestic and public lighting.	Gt. Britain ...	3.69	3.50	3.29	2.97	2.79
	London ...	3.83	3.61	3.39	2.96	2.77
	Rest of G.B. ...	3.61	3.44	3.24	2.98	2.80
Power and traction.	Gt. Britain ...	1.01	1.14	0.942	0.862	0.817
	London ...	1.33	1.33	1.14	0.966	0.895
	Rest of G.B. ...	0.958	1.11	0.902	0.839	0.798
Total.	Gt. Britain ...	1.65	1.76	1.55	1.45	1.38
	London ...	2.42	2.31	2.09	1.84	1.68
	Rest of G.B. ...	1.46	1.61	1.41	1.33	1.29

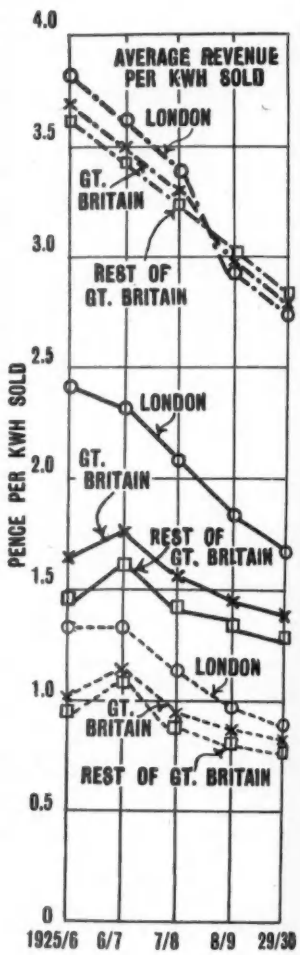
(*f*) The average revenue per kWh sold under each heading in 1929/30 as a percentage of the corresponding average revenue in 1925/6 was as shown in the following table. (Unfortunately, the statistical information at present available does not permit of any calculation as to the actual, or changes in the actual, total costs and average load factor of each class of supply.)


£ MILLIONS
LONDON ACTUAL REVENUE
1925/6 6/7 7/8 8/9 29/30
LONDON ANNUAL REVENUE INCREASES
REST OF GT. BRITAIN ANNUAL REVENUE INCREASES
REST OF GT. BRITAIN ACTUAL REVENUE

	Gt. Britain.	London.	Rest of G.B.
Lighting and domestic, '29-30 ...	76	72½	77½
Power and traction, '29-30	80½	66½	83½
Total, '29-30	84	69½	88½

General Observations

The most striking point in the foregoing figures is the much greater rate of increase in the quantity of electricity sold in the London area between the years 1925/6 and 1929/30 as compared with the rest of the country (83 per cent., as compared with 47 per cent.—para. 2.c.); on the other hand, it will be seen that the total revenue from electricity sold has not increased as rapidly (London 27 per cent., rest of Great Britain 31 per cent.—para. 3.c.). The reason is that, in obtaining the greater sales in the London area, the average revenue per kWh sold has fallen by just over 30 per cent. of the 1925/6 price, as compared with 11 per cent. for the rest of the country—para. 3.f. A quite substantial proportion of this increase in output and drop in average price is due to the effect of the electricity sold to the Southern Railway as the result of its London suburban electrification. If the figures for this supply be excluded from the London area figures the increase in kWh sold in four years becomes 74 per cent., the increase in total revenue becomes 25½ per cent., and the fall in average price nearly 18 per cent., so that even without this exceptional case the progress in the London area was very much greater than elsewhere. The difference is due entirely to the effect on power supplies of the adverse conditions in the rest of the country where kWh sold and revenue for lighting and domestic purposes increased by 92 per cent. and 49 per cent., respectively, as compared with 76 per cent. and 26 per cent. for London. As regards power and traction supplies the percentage increases in kWh and revenue were 37 per cent. and 14 per cent., respectively, for the rest of the country, as compared with 88 per cent. and 27 per cent. for London (paras. 2.c. and 3.c.). If the figures for the Southern Railway supply be eliminated the London figures become 72 per cent. and 21 per cent., respectively. A further indication is that, whereas for the London area the percentages of the total kWh sold and of the total revenue represented by power and traction supplies were practically steady (kWh sold, 56.8 per cent. in 1925/6 and 58 per cent. in 1929/30; revenue, 31 per cent. in 1925/6 and 30.5 per cent. in 1929/30) for the rest of the country kWh sold moved from 81.1 per cent. in 1925/6 to 75.3 per cent., while the revenue moved from 53 per cent. to 46.3 per cent.



So far as Central Board schemes are concerned, in all the areas except South-East England and North-East England the actual output for 1929/30 was below that estimated and particularly in Central Scotland. The total output over the whole country, however, does not differ substantially from the estimate. As far as future years are concerned, it is reasonable to suppose that unless the average selling price of electricity, particularly for power, is adjusted to the new world conditions the annual increase in output will remain low. The early adoption of the grid tariff for Central Scotland should tend towards lower prices in that depressed area, although, presumably, until the standardisation of frequency is completed progress will be retarded.

A New Light-measuring Unit

The heretofore rather indefinite "candle power" standard, used for rating electric light bulbs and other light sources, has been made accurate and invariable in measurement by the United States Bureau of Standards, according to an article appearing in the June number of the Bureau's journal of research. The source of light used in establishing the new standard was the open end of a small tube closed at the other end and maintained at a definite high temperature. The amount of light emitted from the interior of the tube through the open end is not affected by the material of which the tube is made, but depends only on the temperature. The tube actually used was composed of thorium oxide, a very refractory material, and it was kept at a definite accurately reproducible high temperature by immersing it, closed end down, in a crucible of molten platinum. When the platinum begins to solidify the immersed tube is at a definite temperature (3,224 deg. F.) and remains at it so long as any liquid platinum is left. The actual intensity of light from a square centimetre of this source was found to be 58.84 candles.

Cable Search Apparatus

A new method of applying a search coil for the identification of "dead" mains

THE following notes describe how the search coil, which is one of the earliest and best-known apparatus used by maintenance engineers, has recently been applied to a new method of identifying live and dead cables.

It has now become common practice for banks of two, four, six, or even more high-voltage cables to be run alongside one another in the same trench. The keeping of full records of the respective positions of all cables and joints and the terminal equipment which they serve on such routes has become complicated, and in consequence the collection and systematic filing of records as a routine matter has in a number of cases been reduced to the minimum. When it is desired to joint into, or cut, or otherwise break into one of the cables which has, of course, been disconnected from the power station bus-bars, it may not be possible to determine by inspection which of the cables is the "dead" cable upon which it is desired to work. The consequence of cutting the wrong cable might prove fatal to the workman and might seriously affect the continuity of supply. Even in the event of full records being available, it is valuable to have a directly applied check upon the assumption that, at a given spot in a trench which has been opened up, a given "dead" cable upon which work must be done is truly the cable which has been made "dead."

Various experiments have been made at different times in the past in attempting to discover a practical method of identifying cables as suggested above. These have depended mainly on picking up the stray field surrounding live cables, and there has been little success in this direction, particularly in the case of steel-armoured cables. In any case the stray magnetic flux is proportional to the load current, which prevents such a method operating at times of small or no load.

The method which has now proved practicable makes use of the fact that the cable which is being sought for is not carrying power current, and can therefore be made to carry current for identification purposes. The cable search apparatus is connected to the "dead" cable at the most convenient disconnecting point, and circulates in the cores an interrupted current of special wave form, which can perhaps most descriptively be designated "interrupted-interrupted direct current." This is produced by means of a vibrator which is actuated by dry cells and produces a characteristic "peaky" wave form at a frequency of approximately 800 cycles per second. The apparatus contains an electromagnetic interrupter whose function is to close and open the circuit at intervals of approximately one second.

The search coil is held against the exterior of any cable which is to be examined, at any point along the route where identification tests are necessary. It is connected to a specially designed amplifier, to which in turn are connected the head receivers. If the search coil is near to or touching any cable which is alive, either a continuous buzz is heard in the telephones or there is no sound, depending on the current in the cable, the magnetic shielding efficiency of the armouring, and the dimensions. The sound dies away in most cases when the search coil is moved a few inches away from the cable. If the search coil is near to or touching the "dead" cable which is carrying the "interrupted-interrupted d.c.," there is a distinct and unmistakeable sound in the receivers, which dies away when the search coil is moved more than an inch or so from the cable.

The cable search apparatus is conveniently assembled in two parts: (a) the generator, which is contained in a neat wooden case with a leather strap (it is portable, but is usually left at the end of the line under investigation); and (*b*) the searcher, including search coil, amplifier, and head receivers, contained in a light leather case with a strap for carrying it.

A single instance will be sufficient to demonstrate the efficiency of the new apparatus when applied under actual service conditions. On a recent occasion it was desired to select which of two cables (partly underground and partly on concrete posts) was alive. The cables in question formed part of a 33,000-volt line joining two neighbouring power stations in the vicinity of London; the length of the line was somewhat greater than 14,550 yards, of which 2,800 yards was overhead and about 11,750 yards was underground. The cables were 0.15 sq. in. 3-core Hochstadter-type paper-insulated, lead-sheathed, and single-*steel-wire armoured*. The cable which was known to be "dead" was separated by only 2¼ in. clearance from the live cable running alongside, on the same concrete posts by the side of a railway. It was not possible to determine by inspection which positions were occupied by the live and dead cables, respectively. The method of identification was to connect the generator of the cable search apparatus to two cores of the "dead" cable at the power station, these two cores being joined at the far end. The searcher was then held near each of the cables in turn at various points along the seven mile route, and at each point it was immediately obvious, from the note in the telephones, which of the cables was the "dead" cable. No difficulty in identification was experienced.

Tests of this nature indicate that the cable search apparatus will (1) instantly distinguish between "live" cables, whether carrying load or not, and "dead" cables.

(2) work satisfactorily with cables having metallic sheathing, whether of magnetic or non-magnetic materials (these include single-core cables, multi-core cables having a common sheath (*i.e.*, belted or H-type cables), multi-core cables having sheaths on each core (*i.e.*, S.L. cables), both steel-type and steel-wire armoured, and unarmoured).

(3) work satisfactorily with the "searcher circuit" wholly within the sheath (*e.g.*, "go" and "return" on separate cores) or partly within the sheath (*e.g.*, "go" on one core and "return" *via* the sheath).

This apparatus is being manufactured by Standard Telephones and Cables, Ltd., North Woolwich, London, E.16, to whom we are indebted for details of its operation.—J. WILLIAMS, A.M.I.E.E., and N. A. ALLEN, Ph.D., M.Sc., A.M.I.E.E.

Engineering and Financial Returns

The Electricity Commissioner's 1929-30 Statistics

THE new return of statistics relating to electricity supply in 1929-30 by authorised undertakings *only* (the publication of which was reported by us last week) follows the general form of previous volumes. It is divided into two main sections, Part I engineering, and Part II financial.

The following *average* figures per head of estimated population in 1929 indicate the present stage of development: connected load, 250 watts; maximum demand, 99 watts; and sales, 195 kWh per annum. There were 3,472,000 consumers.

Nearly two-thirds of the total supply was provided by public authorities, these proportions applying to capacity of generating plant, to output and sales of electrical energy, and also to capital expenditure. The 500 operating generating stations contain 6,600,225 kW of plant, upwards of 74 per cent. being contained in 88 stations each having an installed capacity of 25,000 kW or over; 208 stations had an installed capacity of less than 1,000 kW each. Over 95 per cent. was of the alternating current type, this figure including plant of 12 different frequencies. Over 81 per cent. of the a.c. plant was of the standard frequency of 50 cycles per second, the two predominating non-standard frequencies of 25 cycles and 40 cycles accounting for 12 per cent. and under 6 per cent. respectively.

Supplies were given at 15 frequencies and at 46 declared voltages. Nearly 82 per cent. of the total supply was sold, the remaining 18 per cent. being accounted for by the works' requirements of the undertakers themselves, and by losses in transmission and distribution, &c. Power accounted for about 62 per cent., lighting and domestic supplies for 29 per cent. and traction supplies for 9 per cent. of the total kWh sold. Sales for lighting and domestic purposes increased by 308 million kWh, and for power by 481 million kWh. During the year there was an increase of upwards of 465,000, or over 15 per cent., in the number of consumers of electricity. Intersales of energy in bulk between authorised undertakers accounted for 22.6 per cent. of the total public supply.

The maximum load based on kWh generated and/or purchased was 4,414,000 kW, and on the generating stations of authorised undertakers 3,601,000 kW. The capacity of generating plant installed was about 83 per cent. in excess of the combined maximum demand. The load factor of the generating stations of public authorities and companies was 31 and 36 per cent., respectively, the combined figure being about 33 per cent. Over 8,880,000 tons of coal and coke was used at an average cost of 15s. 5d. per ton (the same as in 1928-29).

The total capital expenditure amounted at the end of 1929-30 to over £327,000,000, of which 40 per cent. was for generation and 60 per cent. for transmission, distribution, &c. The average expenditure for all purposes per kilowatt of generating plant installed was nearly £50. The capital expenditure during the year was upwards of £29,390,000 (10 per cent. increase).

The total revenue in 1929-30 was £59,711,000 (£55,454,000 in the previous year), representing an average of 1.29d. per kWh sold (1.37d. in 1928-29)). The average revenue per £100 of capital expenditure amounted to £18.2.

Working expenses were over £34,637,000 in 1929-30 (£31,260,000 in 1928-29). They absorbed 58 per cent. of the revenue (56 per cent. in 1929-30). The cost of generation accounted for over 33 per cent. of the total. Of the other principal items, distribution and management each accounted for 13 per cent., while rents, rates and taxes were nearly 16 per cent., local rates alone being over 11.5 per cent. Working expenses per £100 of capital expenditure were £10.6.

Revenue exceeded working expenses by £25,074,000 (7.7 per cent. on the capital). In the case of public authorities, the gross surplus was appropriated as follows: 37.6 per cent. for interest charges; 49.6 per cent. for repayment and sinking funds and reserve and renewals; 9.7 per cent. for capital expenditure; and 2.8 per cent. in relief of local rates—a net contribution of £442,361. The average rates of the preference and ordinary dividends on the capital of the companies at the end of 1929 were 5.87 per cent. and 7.02 per cent., respectively.

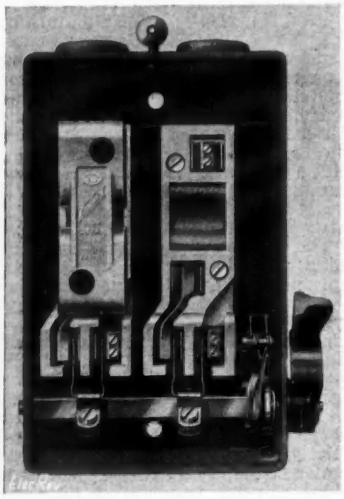
The electricity supply industry gave direct employment to over 61,600 staff and workmen, costing £10,037,000.

New Apparatus and Devices

for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

A Switch-fuse

MIDLAND ELECTRIC MANUFACTURING CO., LTD., Barford Street, Birmingham, sends us particulars of the latest addition to the M.E.M. family, "Memajor," which is supplied as a switch only or as a combination switch and fuses. It is rated at 30 A, 250 V, and has been specially designed for domestic purposes, it being felt that there is a large demand for fully-protected switches and fuses of a larger capacity than those at present available. It is clearly a serious waste to use industrial switches designed for 500 V pressures upon 250 V circuits. The unit is neat and pleasing in appearance. It has few external projections, as the importance of cleanliness and freedom from dust was realised by the designers. Under test at the Birmingham University electrical laboratory a "Memajor" showed itself quite capable of dealing with the requirements of I.E.E. Rule 67B and with B.E.S.A. specification No. 124, so far as performance is concerned.



"Memajor"; Cover and One Fuse Bridge Removed

Fractional H.P. Motors

A very useful range of fractional h.p. motors is being produced by KLAXON, LTD., 36, Blandford Street, W.1. The standard machines are of the series-wound totally-enclosed type of from 1/200th to 1/8th h.p., and are available with single- or double-reduction gearing as combined and compact units. Type "SW" is the smallest motor which has a maximum output of approximately 1/150th h.p. Model KET is a particularly useful machine. As a simple motor it will give an output of 1/50th h.p. with a loading of about 40 W; with reduction gear its loading is of the order of 15 to 20 W. In the illustration it is shown with double-reduction gearing giving a final drive of 1 r.p.m. A wide range of reduction units is available for this model for final speeds ranging from 286 to ¼ r.p.m. Types EK and IK are larger models of 1/40th, 1/10th and 1/8th h.p., and again various gearings are available. A feature of these very small motors is that they can be wound for working at pressures from as low as 6 V up to 250 V d.c. and a.c.

"Klaxon KET" Unit; 1 r.p.m.

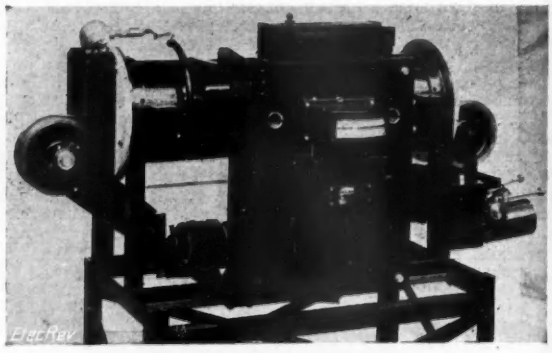
Table Lamp with Plug Points

We have received from MR. R. HARRISON STORER, 9, Hawthorn Grove, Wallsend-on-Tyne, particulars of a new table lamp designed to offer attractiveness with utility. An eight-sided base carries four 5-A plugs and four 5-A switches, one of the latter being a two-way switch controlling the lamp and a plug. The idea is to provide means for a table light and at the same time a supply for a kettle, toaster, coffee percolator, &c. It saves a multiplicity of flexible leads and allows work, such as ironing, to be done under its own light with ease and convenience. All the fittings are of the standard "Bakelite"-insulated type, and the make-up is of polished mahogany, so that there is no danger from leakages.

Table Lamp with "Outlets"

Small Conveyor Furnace

The accompanying illustration shows a small portable electric furnace designed for the continuous heat-treatment of thin metal disks, the method of conveying the disks through the furnace being probably novel. The conveyor consists of two continuous bands of nickel-chrome ribbon on which the disks are placed, and each ribbon passes over a slotted pulley at either end. At the feed end both pulleys have independent counter-weights so arranged that when the strips are hot and expand the slack is automatically taken up, with the result that the strips are always in tension. At the exit end the two pulleys are driven by a ¼-h.p. motor through a variable-speed gear, permitting from 12 to 20 in. per min. conveyor speed. The strips on the return pass under the furnace. The heating chamber is 3 ft. long by 4 in. in diameter, and the loading is 2 kW, 440 V, a.c. Temperature control is automatically regulated by the Wild-Barfield-Foster system of control fixed permanently to the equipment. Fitted with a short length of flexible cable and a power plug, the whole outfit can be moved in the shop from press to press as required. The furnace and control equipment were designed and manufactured by Wild-Barfield Electric Furnaces, Ltd., Elecfurn Works, North Road, Holloway, and represent one of several special designs supplied for the same firm.



W.B. 2-kW Conveyor Furnace

Medium-size Cooker

The No. 800 medium-size "Combination" cooker recently introduced by the BRITISH ELECTRIC TRANSFORMER CO., LTD., Wellington House, Strand, W.C.2, has overall dimensions of 37 in. high, 26 in. wide, and 21 in. deep, with oven cooking space of 14 in. by 12¾ in. by 14 in. The oven elements are controlled by two three-heat switches. There are two square boiling plates and a separate grill. The following points are specially featured by the makers:—new large-type 2-kW enclosed boiling plate; new patented quick-release terminals for boiling plates and grill; elements directly connected, dispensing with terminal bar; protected arrangement of connections under hob; white vitreous enamelled withdrawable draining plate under hob; lever support for hob when in open position; grill drop door fitted with frictional balance spring; oven shelf runners enamelled; lever-type oven door handle; new one-nut-fixing switches; larger hot-cupboard space; steatite used throughout for element-coil carriers.

No. 800 "Tricity" Cooker

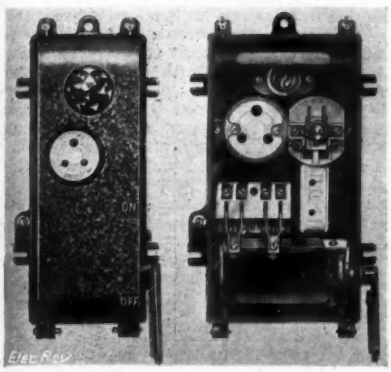
Insulated Pliers

The "Thunderbolt" pliers marketed by BUCK & HICKMAN, LTD., 2, 4 and 6, Whitechapel Road, E.1, are of good Lancashire manufacture and are made in three lengths of 6, 7 and 8 in. By a new special process the handles receive a seamless

hard-rubber covering which, due to its flexibility, is exceptionally smooth and comfortable to grip and not liable to chip or break. This feature enables the tool to withstand very hard knocks.

Cooker Control Apparatus

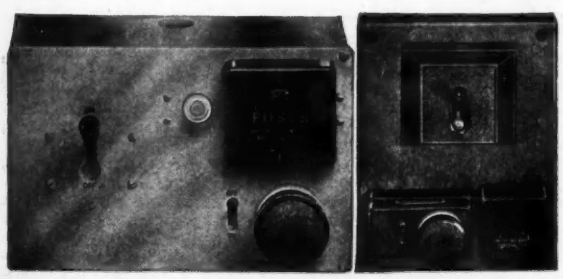
Compactness in design, combined with neat and attractive appearance, has been aimed at in a new range of cooker control units introduced by J. H. TUCKER & Co., LTD., Kings Road, Tyseley, Birmingham. The standard finish is enamelled battleship grey. There are eight models in the range, all fitted with a 30-A d.p. cooker switch and a pilot lamp, in addition to a 5- or 15-A two- or three-pin socket for the subsidiary circuit. In four models the subsidiary socket is controlled by a suitable switch protected by a s.p. H.O. pattern fuse, but in the remaining four there is no secondary switch. The SC4 and SC23 types have not and have, respectively, sub-circuit switches.



Tucker SC4 and SC23 Cooker Units

The new cooker control boards produced by M.K. ELECTRIC, LTD., Wakefield Street, Edmonton, N.18, are supplied in two types, *i.e.*, ironclad and all-insulated hardwood panels. They are very attractive and neat, and the ironclad model has an enamelled iron case with a front plate of dull nickel. This cooker switch is designed to carry a constant load of 30-35 A, and the switch handle is on the front of the board. The most popular type with regard to the subsidiary circuit has embodied a five-A three-pin interlocking switchplug, but a number of alternatives can be provided. Immediately above the kettle circuit are mounted two 15-A fuses with a "Bakelite" cover. There is also a small pilot lamp.

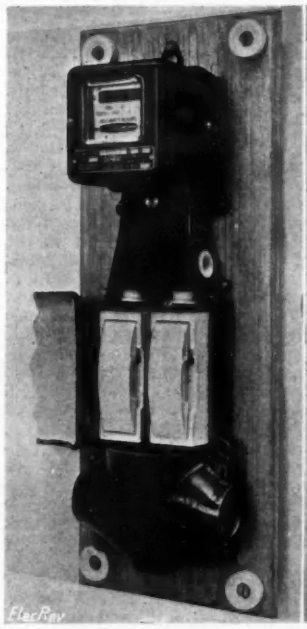
The switch of the all-insulated model is similar to that of the ironclad type, and has a brown "Bakelite" cover. The "kettle" circuit may be fitted with a five-A three-pin interlocking switchplug, or with a 15-A switchplug, or an "anti-flash" socket and plug of any design and size. These boards can also be supplied with d.p. change-over switches.



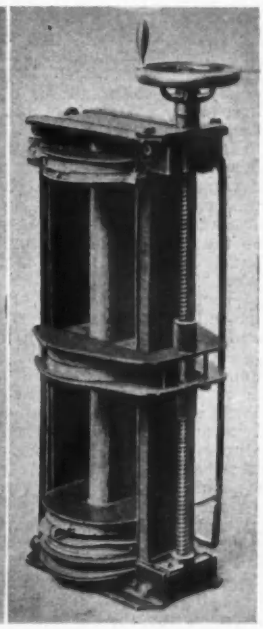
Ironclad and Hardwood M.K. Cooker Panels

Moving-coil Voltage Regulators

A range of moving-coil voltage regulators introduced by FERRANTI, LTD., Hollinwood, Lancashire, may be used either separately or in conjunction with a main step-up or step-down transformer. They vary the voltage uniformly, and can be left in any position. There are no switches or contactors, and no currents are broken. The moving parts are entirely isolated and do not involve flexible leads, sliding contacts, or slip-rings. Two coils connected in series across the supply voltage are mounted at the top and bottom, respectively, of one limb of an iron core. A further coil short-circuited on itself can be moved up and down the leg between the other coils. When the third coil is at the top of the leg the impedance of the top coil is relatively small, and the impedance of the bottom one relatively large. The greater part of the supply voltage is impressed, therefore, across the bottom coil. When the short-circuited coil is at the bottom of the leg these conditions are, of course, reversed, and by varying the position of the movable coil the voltage across the top coil can be varied from practically zero to the full supply voltage. In applying the principle for regulators which work in conjunction with a main step-up or step-down transformer, if a 20 per cent. range of voltage variation is required, a tapping is taken from the secondary winding at 80 per cent. and connected to the two coils of the regulator in series. By varying the position of the moving coil the voltage across the bottom regulator coil and the 80 per cent. winding can be varied uniformly between 80 and 100 per cent. For regulators which provide the necessary voltage variation independently of any main transformer an extra winding is assembled on the core close to the top regulator coil, so that the leakage reactance between these two windings is small. The voltage across the extra winding will then always be a definite fraction of the voltage across the top regulator coil. Since movement of the short-circuited coil varies the voltage across the top coil, the voltage across the extra winding will vary in a similar manner and give the required variable boost of the outgoing voltage.



Siemens House Service Unit



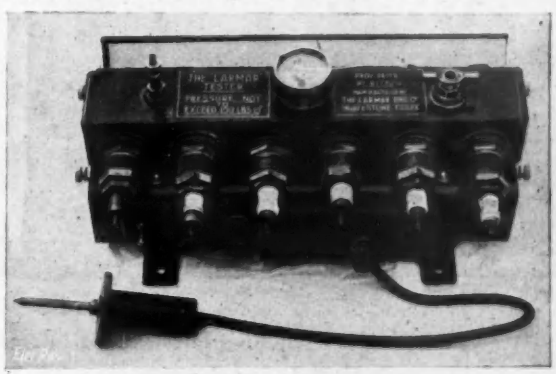
Ferranti 100 per cent. Voltage Regulator

House Service Unit

A recent introduction of SIEMENS ELECTRIC LAMPS & SUPPLIES, LTD., Caxton House, Westminster, S.W.1, provides a meter, fuse box, cable box, and a cover for the connecting leads between the fuses and the meter all assembled on a board as a complete metal-clad unit. By virtue of there being no leads exposed, protection is afforded in such places as cellars, while the enclosure of the meter leads is a prevention against pilfering.

An Ignition Testing Set

Equipment has lately been put on the market by the LARMAR ENGINEERING CO., Ingatestone, Essex, by means of which sparking plugs can be tested under actual working-pressure conditions. The testing unit is divided into two sections, the upper part or compression chamber, into which the plugs to be tested are screwed, and which is designed for a working pressure not exceeding 100 lb. per sq. in. A valve is provided in the top of the unit by means of which the desired pressure—indicated on a gauge—may be obtained. A pressure release valve is also provided. The bottom chamber comprises a steel tube enclosing a h.t. coil wired up to two terminals and a switch and a h.t. "pick-up," the last being coupled up by a flexible lead to a hand testing spike. The tester is so designed that it can be bolted down to a bench, or fixed to a wall in a vertical position. A mirror is fitted at the rear of the whole assembly, thus enabling the operator to watch the sparking plugs under test from the same side as the plugs are inserted and removed. For the testing of a set of sparking plugs they are secured in position in the top container by means of gas-tight washers. The air pressure in the container is then brought up to 100 lb. per sq. in., and a 6-volt battery is coupled up to the two l.t. terminals. Then, with the switch in the "on" position and the hand testing spike on a plug, the mirror will show how the plug is firing. The tester is made in various sizes suitable for two, four, or six sparking plugs, and it can also be used for the testing of ignition coils and magnetos.



The Larmar Ignition Tester

The N.P.L. Inspection

The annual visit by the General Board revealed exhibits of more than usual interest this year

THE annual inspection of the National Physical Laboratory took place on Tuesday, the visitors being received by Sir Gowland Hopkins, president of the Royal Society and chairman of the General Board, Sir Richard Glazebrook, chairman of the Executive Committee, and Sir Joseph E. Petavel, director.

The reception took place in the Aerodynamics Department, where a new compressed-air wind tunnel is nearly completed, in which air at 25 atmospheres pressure can be circulated while an aeroplane model is in position. Three 400-h.p. compressors are provided in an adjoining room, and can charge the tunnel in about 80 minutes. The compressed air in the tunnel is circulated by a two-bladed duralumin airscrew driven through a stuffing box by an external motor of 400 h.p. to produce a wind speed of 90 ft./sec. at the full pressure, and will give conditions corresponding to those of a full-scale machine of average size flying at 150 miles per hour. The apparatus for the measurement of forces on models in this tunnel is entirely electrical and is controlled from outside the tunnel. There are eight special plugs in the shell through which about one hundred electrical conductors, and a few pressure tubes for wind speed measurement, are led into the interior. A special battery is provided to operate the electrical balances, as a very steady voltage is essential for this purpose.

A very neat method of rendering streamline air flow visible was developed in 1930. A number of fine platinum wires, heated by an electric current, are stretched across the air flow near a model. Each wire gives rise to a band of heated air, which follows the direction of the streamline passing the wire. The shadows of the heated air filaments are cast on a screen, and thus give a direct picture of the streamlines.

Considerable research work is now being directed towards the study of the mechanical properties of metals at high temperatures. In the Engineering Department new creep testing plant has been constructed which is much more accurate than any previously available. It will measure creep rates of the order of one hundred millionth of an inch per hour. In the same machine the elastic properties of specimens can be examined with great precision either before or at any stage during creep. Preliminary experiments show that specimens under examination can be maintained within half a degree centigrade of the required temperature for long periods by means of a specially-designed temperature control.

In the Metallurgy Department the possibility of producing alloys lighter than those of aluminium is in course of development. Beryllium possesses very interesting properties: it is much harder than magnesium, has a melting point twice as high (1,285 deg. C.), and has superior corrosion resistance. This metal is still too expensive for general industrial use, and satisfactory alloys have yet to be developed. Though usually prepared in bulk by the electrolysis of its fused fluoride at a white heat, it has recently been found possible at the laboratory to electro-deposit beryllium at much lower temperatures. An exhibit of beryllium electro-plated on copper in this way was on view.

In the Metrology Department a vibration clock was noticed in which the longitudinal vibrations of a metal bar held at its centre are utilised to provide a "pendulum," oscillating about 2,367 times per second. The "pendulum" is then linked electrically to counting mechanism by using an amplified current generated by the motion of the bar to drive a phonic motor synchronously. One spindle of the clock train driven by this motor rotates once per second, thus providing a source of time in convenient units. For high precision measurements, seconds signals can be taken off with great accuracy, and can be transmitted to a special chronograph by which time observations can be made to within one five-thousandth of a second.

An attempt is being made to establish a wave of light as the universal length unit in substitution for the present material standards represented by the imperial standard yard and prototype meter. Apart from the advantages of indestructibility and permanence, the proposed unit offers possibilities of increased accuracy in reproduction and measurement. The work so far accomplished indicates that the yard and metre lengths can be reproduced to an accuracy of about four millionths of an inch, and further refinements of the apparatus are likely to increase the accuracy to one millionth of an inch.

In the Electricity Department attention was directed to the fact that all substances possess magnetic properties and that it is sometimes important to be able to measure them, even when they are very feeble. For example, in geological surveying a knowledge of the magnetic properties of various rocks is required. One exhibit was a form of balance by means of which the magnetic forces due to such materials may be measured, and it will test materials a hundred million times less magnetic than ordinary iron.

The Wireless Division showed a new type of "Dynatron" oscillator for frequencies up to 50 million cycles per second (wave-length of 6 metres). It has long been known that under certain conditions a valve could be made to have a current-voltage characteristic with a downward (negative) slope. Under these conditions it behaves like a negative resistance and when connected to a tuned circuit it has the effect of cancelling the resistance of the circuit and causing it to oscillate continuously. Hitherto the upper frequency limit of such oscillators has been about fifteen megacycles (15,000,000 cycles), but the slightly modified circuit shown, including a screen-grid valve, can be used for the generation of oscillations at frequencies up to about fifty megacycles (*i.e.*, a wave-length of about six metres).

When a tuned circuit is connected in series with a valve the resistance of the valve has the effect of "damping" the tuned circuit and making it less selective or sharp in tuning. Under certain conditions the anode circuit of a screen-grid valve can be made to have, in effect, a negative resistance. When a tuned circuit is connected in series with a valve operated in this manner its resistance or "damping" is actually decreased by the valve, and its selectivity or sharpness of tuning can be very greatly increased. Such an arrangement is very conveniently applicable to obtaining high selectivity in an audio-frequency amplifying stage, for use in receiving continuous-wave telegraphy free from interference.

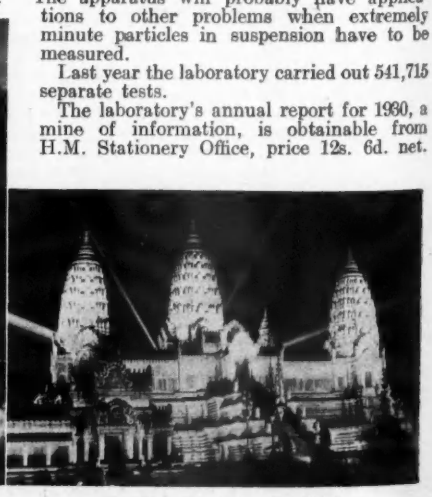
The light diffusing properties of opal glasses are of importance in the design of fittings for illumination systems and are governed very largely by the size and concentration of the minute particles embedded within the body of the glass, which may be less than one thousandth of a millimetre in diameter; that is, their maximum diameter may be only very slightly greater than the wave-length of light and therefore only just discernible with the aid of a powerful microscope. To study these particles a very thinly ground specimen of the glass under examination is set up on the stage of a powerful microscope in the Photometry Division and, by means of a specially-designed mechanical device, the stage is moved extremely slowly across the field so that a particular particle can be brought from one side of the cross-wire to the other. At the same time, by means of a diffraction apparatus, one part of which is attached to the microscope stage, the number of diffraction fringes which pass a given point in the field is counted to provide a measure of the diameter of the particle being studied. The apparatus will probably have applications to other problems when extremely minute particles in suspension have to be measured.

Last year the laboratory carried out 541,715 separate tests.

The laboratory's annual report for 1930, a mine of information, is obtainable from H.M. Stationery Office, price 12s. 6d. net.

The Annam Pavilion

The Algerian Pavilion



The Temple of Angkor-Wat

Striking Floodlighting Effects at the International Colonial Exhibition now being held in Paris

Business and Industrial Notes

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures

"Electrical Review" Index

The Index to Vol. CVIII (for the half-year ending June 30th, 1931) is in course of preparation and will be published shortly. We shall be glad to receive the names and addresses of those who require it (free of charge) for binding purposes, or wish to retain it for reference. Application should be made as early as possible to the Publisher, 4, Ludgate Hill, E.C.4.

Special Displays at Eastbourne

One of the things which is attracting the attention of the delegates to the Electrical Contractors' Association conference at Eastbourne is the beautiful lighting of the facade of the Grand Hotel which is the conference headquarters. This has been provided by the British Thomson-Houston Co., Ltd., and

The Grand Hotel, Eastbourne, at Night

is very ingenious. The main portion of the building is illuminated in a soft rose colour. Over the main entrance, however, a changing-colour scheme has been adopted by means of which variations of red, green, amber and blue lighting are obtained with striking effect. The installation comprises a battery of 58 projectors, 46 of which contain 1.500-W "Mazda" lamps with colour screens, while the rest employ 1,000-W lamps. The projectors illuminating the central portion of the building are controlled by a large four-circuit dimmer. A local firm, Messrs. Beney & Son, carried out the installation, and Venreco, Ltd., London, designed and supervised the colour effects. Energy for the illumination is being provided gratis by the Corporation Electricity Department.

Another leading electrical company which has carried out special lighting for the occasion is the GENERAL ELECTRIC CO., LTD. Floodlighting by means of G.E.C. projectors has been installed at Eastbourne College, and G.E.C. lighting schemes are in evidence in other parts of the town, notably on the front—a night view of which is reproduced. The G.E.C. is also staging special displays of its "Magnet" domestic appliances at three local contractors' premises—Messrs. H. Beney & Sons, Messrs. Martin's, and Messrs. Page & Miles, Ltd.

G.E.C. Lighting at Eastbourne

A Large Telephone Development

Mr. Ivar Kreuger, of Kreuger & Toll, and Colonel Sosthenes Behn, of the International Telephone and Telegraph Corporation, have announced that Kreuger and Toll have become interested in the International Telephone and Telegraph Corporation, and that the International Telephone and Telegraph Corporation has acquired an interest in the L.M. Ericsson Company, which is controlled by Kreuger and Toll. This association will result in co-operative action by these two telephone companies, and is expected to be beneficial to telephone development throughout the world. Mr. Ivar Kreuger and Mr. Frederick W. Allen, of Lee Higginson & Co., will be elected to the board, and Mr. Kreuger will also become a member of the executive committee of the International Telephone and Telegraph Corporation.

Municipal Trading at Exeter

Our Exeter correspondent reports that strong protests have been made, chiefly by local electrical contractors, against the Exeter Corporation's recent decision to offer various electrical appliances to the public on the hire-purchase system. The general objection is that the Electricity Department is ill-advised in introducing a form of municipal trading which is bound to react unfavourably on local electrical contractors, regardless of the present economic crisis. "The sale of these articles," says an electrical contractor in a letter to a local newspaper, "represents the legitimate profit of the several contractors in the city; out of such profits they have to pay their rates and ever-increasing taxation." Opponents of the scheme maintain that in every case the same hire-purchase terms can be obtained from the contractors, often at better advantage to the buyer.

The North-East Coast Exhibition

The Times reports that the North-East Coast Exhibition held in 1929 was a financial success, and the guarantees asked for by the promoters have been cancelled. The sum of £150,000 was asked for, but the fund reached £173,755. There were 2,048 guarantors, and the largest of these was the Newcastle Corporation, which was responsible for £25,000. The Lord Mayor of Newcastle states that in addition to the stimulus which it gave to local industry the exhibition was a benefit to British foreign trade, as it was visited by large numbers of people from all parts of the world. The grand total of attendance was over 4,000,000.

Employment during May

The June *Ministry of Labour Gazette* states that although employment in the engineering industry as a whole remained bad during May, there was a further improvement in the electrical section. The number of unemployed in the engineering industry at May 18th was 250,108, an increase of 2,369, and representing a percentage of 24.6. The number of unemployed in the electrical engineering section declined to 12,245, the proportion being reduced from 14.9 to 14.7 per cent. There were decreases in unemployment in the electric cable, wire, and lamp manufacturing group and in the electrical wiring and contracting industry. In the former the number declined to 15,750, and the proportion from 15.9 to 15.3 per cent.; in the latter the number decreased to 3,022, and the percentage from 16.4 to 16.3.

Legal

AN EXPIRED LAMP PATENT.—Mr. Justice Luxmoore, in the Chancery Division on June 23rd, had before him a motion by the British Thomson-Houston Co., Ltd., against the Western Metal Co., Preston, who did not appear or defend, in respect of the infringement of the plaintiffs' patent relating to gasfilled electric lamps. Mr. Tookey, for the plaintiffs, said that the patent expired on May 7th last and therefore he could not ask for an injunction. What he did ask for was delivery up of all articles and things in the defendents' possession that were constructed in infringement prior to the expiration of the patent, an inquiry as to what damages, and costs. His Lordship granted this relief.

Safety First

A little booklet entitled "Brief Notes for Safety Organisers and Safety Committees" (price 1s.) has just been issued by the National "Safety First" Association (Inc.), 119, Victoria Street, London, S.W.1. The publication is designed to act as an aid to efficiency in making inspections of departments, works, &c., and to intimate the various points on which a safety officer should be able to report.

A Colour-lighting Demonstration Theatre

The latest enterprise of Holophane, Ltd., is the construction at its premises at Elverton Street, Westminster, of a new theatre designed solely for the purpose of demonstrating its colour-lighting system. The new theatre, which can seat between 60 and 70 persons, was officially opened on June 18th. After a brief introduction of the "Holophane" colour-lighting system by Mr. H. Hepworth Thompson, managing director, a demonstration of the various effects was given by Mr. R. Gillespie Williams, chief colour consultant to the company. Many changes in the design of curtains, scenic effects and dresses, solely by the application of colour-lighting, were shown, and among numerous striking effects obtained were a dance of coloured shadows and the use of the cyclorama, with colour changes, for the presentation of open-air scenes. An illustration of the demonstration theatre appears above.

The "Holophane" Demonstration Theatre

Decorated Trade Vehicles at Ringwood Carnival

At a carnival held last Saturday at Ringwood the first prize for decorated trade vehicles was won by a motor lorry belonging to the West Hampshire Electricity Co., Ltd. On the car were exhibited a number of the smaller electrical appliances such as fires, kettles, vacuum cleaners, and toasters, and watching over them was a figure of a cock bearing the superscription "Something to crow about." The back and sides of the vehicle displayed the words "Electricity for happy homes" and "Electricity—cock of the walk."

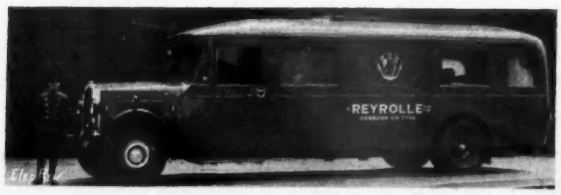
Prince George at Electrical Works

During his recent northern tour, Prince George visited the works of British Insulated Cables, Ltd., at Prescot, and those of the Metropolitan-Vickers Electrical Co. at Trafford Park. At the former His Royal Highness was received by Sir Alexander Roger, chairman of B.I.C., and was enthusiastically welcomed by a large number of the staff and workpeople of the company. The Prince inspected some of the principal departments of the factory, and in the above picture is shown watching the laying up of a three-core e.h.p. cable which will be used in the grid system. On arrival at the Trafford Park works, the Prince was received by Sir Philip Nash, the chairman of Metropolitan-Vickers, and a number of the directors and members of the Management Committee. In the course of his tour of the works he paid a visit to the Transformer Department and showed particular interest in the large transformers being constructed for Pykara, the London Power Company and the North Nile Reclamation Scheme. Passing to the foundry the Prince saw the metal being poured for the yoke of a large rolling mill motor and, in the *Manchester Guardian* photograph reproduced below, is shown casting a medallion of himself in an aluminium silicon alloy, a recent production of the company which has special properties of lightness and ductility.

The Prince at Prescot

A Reyrolle-Holmes Mobile Showroom

Among the interesting things seen at the I.M.E.A. Convention was a mobile showroom arranged jointly by Messrs. A. Reyrolle and Co., Ltd., and J. H. Holmes & Co., Ltd., which we illustrate herewith. The showroom, which is mounted on a 38-h.p. Leyland "Lioness" chassis, provides comfortable office accommodation in addition to the space available for exhibits, the total floor space being approximately 18 by 7 ft. A "sunshine" roof gives adequate ventilation and facilitates the loading of the showroom and doors are provided at the front and back of the vehicle for entrance and exit.



The Reyrolle-Holmes Mobile Showroom

The exhibits consist generally of examples of sub-station and industrial switchgear and of motors—typical of those required for the frequency change-over amongst other purposes—and unit-type distribution switchgear manufacured by Messrs. J. H. Holmes & Co.

In the Foundry at Trafford Park

Exide Service Convention

Representatives from many parts of the world attended the Exide Service Convention held at Bournemouth from June 16th to 18th, which was the largest gathering of its kind yet arranged by the company. Useful discussions took place on technical and financial matters and considerable attention was given to the important question of sales problems. An interesting function connected with the convention was the banquet, followed by a cabaret and dance, held in the Municipal Pavilion, on Wednesday night, when 700 people were present.

The Exide Agents' Conference

The vigorous development of the service was revealed in the speech of Mr. D. P. Dunne, chairman of the company, who, in proposing "The Mayor and Corporation of Bournemouth," said that 25 years ago there were two important firms of battery makers in the world, one in Germany and the other in America. The company's representatives determined that they should have a place in the world's markets and now they were not only the largest firm of battery makers in the British Empire, but one of the three largest in the world. There were six hundred agents in this country for one section of the business alone, while throughout the world there were in the neighbourhood of thirteen thousand Exide battery service agents. Regarding prevailing trade depression the electrical industry was not so depressed as many others, and in the battery line the prospects at the present time were better than they had ever been. Mr. A. W. Browne, assistant general manager, proposing the health of the guests, indicated how the business of the company had grown by comparing the present important convention with the first that was held some ten years ago. Mr. Grinnell S. Harvey, service manager, proposed "The Exide Service Agents," and Mr. Ronald Winder, jun., replied. Mr. H. Elston, Mayor of Brecon, spoke of the value of the annual conventions as a stimulus to business. In a concluding word Mr. Dunne referred to foreign competition and the quality of British goods, and mentioned that the company had recently secured an order for two submarine batteries though the price was nearly £10,000 higher than that of competitors.

Wages in the Engineering Industry

In an endeavour to prevent the development of trouble in the engineering industry as a result of the employers' decision to institute alterations in wages and conditions on July 6th, representatives of the trade unions concerned held a conference in London last week. Sir Allan Smith, chairman of the Engineering and Allied Employers' Federation, was interviewed, and it was agreed that negotiations should be re-opened at a meeting of the joint negotiating committees on the following day. As the outcome of these negotiations it was announced that a compromise had been reached. The employers undertook to withdraw their terms on July 6th in favour of the following new conditions:—The first two hours of overtime shall be paid for at time-and-a-quarter, and the rate thereafter shall be time-and-a-half. Allowances are made for work after midnight. Night-work shall be paid for at time-and-a-sixth and overtime as for daywork overtime. Under the three-shift system the first shift shall work 43 hours per week and be paid for 45 hours' work; the second shift shall work 37½ hours and be paid for 45; and the third shift shall work 37½ and be paid for 47 hours. Piecework rates shall be fixed to yield 25 per cent. above time rates, or *pro rata* where the existing payment is more than 33⅓ per cent. above time rates.

Compensation for Displaced Employés

At a recent meeting of the Southend Town Council it was reported that Sir Harold Morris, K.C., the referee appointed by the Ministry of Labour, had awarded £250 to a fitter and welder whose services had been dispensed with by the Electricity Department consequent upon the taking of a supply of electricity in bulk from the County of London Electric Supply Co., Ltd. The Town Clerk also reported that a number of similar claims had been received from discharged employés and the Council instructed him to apply to the Ministry of Labour for the appointment of a referee to consider these claims.

Proposed Austrian Tariff Changes

According to the *Board of Trade Journal*, the Austrian Government proposes to impose increases in the general Customs tariff. It is apparently not intended to alter the "conventional" tariff rates, which Great Britain enjoys *inter alia*. The proposals affect several electrical items, including dynamos, motors, transformers, switches, batteries, &c.

E.D.A. July-August Programme

The programme of the British Electrical Development Association for July and August includes an abridged report (E.D.A. 933) of the E.D.A.-E.L.M.A. Shop and Display Lighting Campaign carried out last autumn, which contains abstracts of expressions of opinion concerning the immediate advantages of the campaign. The suggested window display for July (shown in the illustration below) makes a special feature of electric washing machines, while the displays for August, for closed- and open-type windows, are appropriately confined to electric fans. Examples of local advertising are given, and a price list of literature dealing with fans, refrigeration, cooking, washing, and ironing, together with illustrations and prices of E.D.A. posters, are included.

For Sale

The freehold factory of Messrs. Callard, Stewart & Watt, Ltd., at the corner of Northdown Street and Collier Street, King's Cross, N., is to be sold by auction at the London Auction Mart, E.C.4, on July 16th.

The Levant Fair

This Fair, which is to be held at Bari, Italy, from September 6th to 21st, will include an engineering and electrotechnical section. The British agent of the Fair is Dr. F. Pesenti, 98, Westminster Bridge Road, S.E.1.

Local Exhibitions

The South Wales Electrical Power Distribution Co. (in association with the Shropshire, Worcestershire and Staffordshire Electric Power Co.) has arranged to have an exhibit at the forthcoming Royal Welsh Show at Llanelly on similar lines to its stand at the recent Three Counties Show at Hereford.

E.D.A. July Window Display

A very successful all-electric exhibition was held recently at the Town Hall, Durham, by the County of Durham Electrical Power Distribution Co., Ltd. Every afternoon and evening lectures were given on housecraft and cookery and there were continuous demonstrations of washing by electricity. Radio and gramophone recitals proved very popular and much attention was paid to demonstrations of sewing, darning and embroidering by electricity. The exhibition was opened by the Mayor of Durham, Councillor J. W. Pattinson.

Social Events

The ninth annual sports and gala of the Sports Club of Messrs. Siemens Bros. & Co., Ltd., was held on Saturday last at the company's sports ground, Charlton. Fine weather favoured the occasion and as in previous years there was a very full afternoon's programme, commencing with a 75 yards handicap race for the children and reaching a climax with the 2-mile team race for the inter-departmental championship. A large attendance watched the many close finishes, and interest was maintained by such amusing events as tilting the bucket, sack and wheelbarrow races, &c. Sideshows, in the hands of attendants with strong vocal chords, were again a feature and were well patronised. At the conclusion of the events, the prizes, which included numerous trophies, were distributed by Lord Queenborough, and an enjoyable function was concluded with an excellent concert under the management of Mr. A. E. Lloyd. Music during the afternoon was provided by the Speech and Music Amplifying Co.

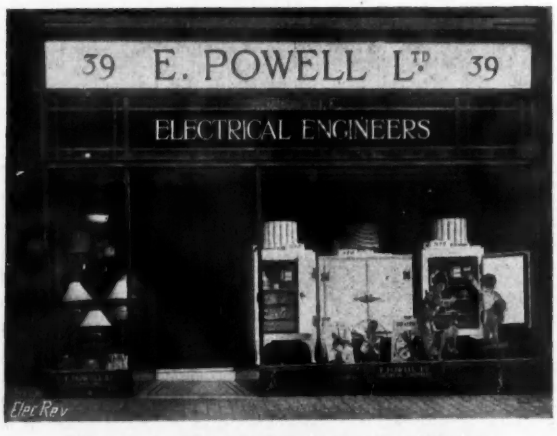
Members of the Siemens Golf Club played a "bogey" competition at Ashton Park, Preston, on June 13th, for the "S. H. Callow" prize. The competition was won by Mr. J. N. Aldington (handicap 6) with a card of one down, the second and third places being taken respectively by Messrs. P. D. Oakley and A. G. Ogles.

The fifth annual sports meeting of the Clesco Sports and Social Club will be held at its sports grounds at Raynes Park, Wimbledon, to-morrow, June 27th, at 3 o'clock. A large attendance is expected as in previous years. The prizes will be presented by Miss Greenwell, daughter of Sir Bernard Greenwell, Bart., vice-chairman of the County of London Electric Supply Co., Ltd.

A cricket match between the Varley works staff and London office staff and the "Olipel" cricket club was played on the sports ground at Charlton on Saturday, June 13th, under ideal weather conditions. These matches between the staff and the club are always eagerly contested and this match was no exception, resulting in a win for the club by eighteen runs. The chairman and directors of the company were present, and after the match the teams and their friends were entertained to tea.

A Refrigerator Display

With the advance of summer and the prospects of high temperatures in the near future, Messrs. E. POWELL, LTD., of 39, High Street, Tunbridge Wells, are making a special display of electric refrigerators, as will be seen from the accompanying illustration. The showrooms of this company are



Messrs. E. Powell's Refrigerator Display

extensive, and the apparatus displayed covers a wide ground, including a variety of electrical fittings, fires, cookers, and other domestic appliances.

Recent Contracts

The Russian Chamber of Commerce in Stockholm has lately placed a contract with the Swedish associates of Messrs. BOVING & CO., LTD.—Aktiebolaget Karlstads Mekaniska Verkstad, Verkstaden, Kristinehamn—for the supply of four single-runner vertical-shaft Kaplan turbines for the Svir power station, Russia. It is claimed that these are not only the largest Kaplan turbines ever built, but the runners have the distinction of being the largest in the world for any type of water turbine. Each turbine has been designed for an output of 42,000 b.h.p. under a net head of 36 ft. and is to run at a speed of 75 r.p.m. The external diameter of the turbine is 41.5 ft. and the total weight 662 tons. The runners, which have blades adjustable under load by means of an oil servomotor located in the runner hub, are 24.5 ft. in diameter and weigh 151 tons each.

The ELECTRIC FURNACE CO., LTD., has received an order from a well-known Continental steelworks for a high-frequency furnace installation which, it is claimed, will be the largest unit hitherto constructed. The motor-generator set will have a power input of 1,375 kW, and the furnace will be capable of melting four-ton charges. Provision will also be made for a furnace body of seven tons for the treatment of molten metal.

As a part of the development plan for Bedi Port, Kathiawar, India, a "Marconi" coast station for communication with ships at sea is to be installed to the order of the Port Commissioner, Lieutenant-Commander Bourne, R.N. The order has been placed through the INDIAN RADIO TELEGRAPH CO., LTD. The equipment will comprise a "Type M.C.13" 1½-kW transmitter operating on the interrupted continuous wave system and the new "Type 352" receiver.

The General Post Office have placed a further order with Messrs. SIEMENS BROTHERS & CO., LTD., Woolwich, for another 200,000 "Neophone" microtelephone instruments. This, the company states, is the largest order for telephone instruments ever placed with one supplier in Great Britain.

Electrical Demonstrations at Manchester

In our last issue (p. 1062) reference was made to the conversion of the old stores of the Manchester Corporation Electricity Department, at Dickinson Street, to a demonstration

A Manchester Demonstration Room

room where manufacturers are able to demonstrate electric furnaces, welders, canteen cookers, &c., before persons interested. The accompanying illustration is reproduced from a photograph we have received from Mr. H. C. Lamb, chief engineer and manager of the Corporation electricity undertaking, in which it will be seen that the old stores have been put to effective use.

Catalogues Required

Messrs. KERSHAWS, electrical engineers and contractors, 3, Warwick Street, Oldham Street, Manchester, ask for catalogues from manufacturers of knife switches and contactors.

Trade Announcements

The Z ELECTRIC LAMP & SUPPLIES CO., LTD., announces its removal to larger premises at 21, Newman Street, Oxford Street, London, W.1, as from next Monday, June 29th.

MR. JOHN W. NORTON, late technical partner of Norton and Shapley, Torquay, has commenced business as a radio engineer at Radio House, Torquay Road, Paignton.

The address of the London branch of IMPAG, LTD., is now 10, Lloyds Avenue, London, E.C.3.

IONIC ALKALINE BATTERIES, LTD., have moved into larger premises at 26, High Street, Stratford, London, E.15.

New Catalogues and Lists

FALK, STADELMANN & CO., LTD., 83-93, Farringdon Road, London, E.C.1.—An illustrated catalogue (No. 646) of "Efesca" electric cooking and domestic appliances.

MOUL & CO., LTD., 21, Old Queen Street, London, S.W.1.—List No. 84, dealing with the company's range of "Tachographs."

M. W. WOODS, LTD., 46, Kingsway, London, W.C.2.—A folder illustrating the company's small electric motors and "Windifan" exhaust fans.

ELLIOTT BROTHERS (LONDON), LTD., Century Works, Lewisham, London, S.E.13.—A pamphlet (G49/52) describing the "Elliott" split-core current transformers.

The GLASGOW ENGINEERING CO., LTD., 45-47, Pitt Street, Glasgow.—Publication No. 2531, giving particulars of the latest types of "Garty-Apex" wind motors for electric lighting, power, pumping, &c.

ISENTHAL & CO., LTD., Ducon Works, North Acton, London, W.3.—An illustrated booklet dealing with "N.C." automatic voltage regulators.

O. N. BECK, 11, Queen Victoria Street, London, E.C.4.—A leaflet describing the "H.T." individual electric drive for three-phase current.

The BRITISH PORCELAIN CO., LTD., Artillery House, Artillery Row, Westminster, London, S.W.1.—The May issue of the "Vista" pertaining to modern methods of porcelain insulator manufacture, the practical value of grading shields and forged steel pins for post insulators.

J. J. EASTICK & SONS, 118, Bunhill Row, London, E.C.—The June number of the Eelex Radio Bulletin."

G. A. HARVEY & CO. (LONDON), LTD., Woolwich Road, London, S.E.7.—An illustrated booklet (No. 518) on galvanising.

The EDISON SWAN ELECTRIC CO., LTD., 123-5, Queen Victoria Street, London, E.C.4.—Lists H.C.644 and T.659, dealing, respectively, with "Ediswan" domestic appliances and "Tungar" battery chargers and a.c. rectifiers.

WHITTAKER BROS. (ACCRINGTON), LTD., Accrington.—A leaflet, giving particulars of the "Joywheel" electric mangle and mangle attachments.

The ENGLISH ELECTRIC CO., LTD., Stafford.—Publications M.55 and M.68, relating, respectively, to auto-transformer starters for squirrel-cage motors, and portable motors for the agricultural industry.

The LONDON ELECTRICAL CO., 1, Sherborne Lane, King William Street, London, E.C.4.—Publications dealing with the new season's electric fans and with the T.M.C. electric mains clock.

The A.E.G. ELECTRIC CO., LTD., 131, Victoria Street, Westminster, London, S.W.1.—The June London stock list of electric motors, drills, time switches, meters, circuit breakers, and domestic appliances.

BRITISH INSULATED CABLES, LTD., Prescot, Lancs.—A 60-page illustrated catalogue of "Helsby" rubber-insulated cables and wires.

BROOK MOTORS, LTD., Empress Works, Huddersfield.—A price list of machine tools.

ARCHIBALD KENRICK & SONS, LTD., 65, Newman Street, Oxford Street, London, W.1.—An illustrated catalogue dealing with "Kenrick" electric irons, fires, cookers, and accessories.

GEO. BRAY & CO., LTD., Leeds.—Catalogues C.9, 10 and 11, describing the whole range of "Chromalox" heating elements, immersion heaters, and boiling plates.

The VINCENT SWITCHGEAR MANUFACTURING CO., LTD., Sampson Road North, Birmingham.—A 40-page catalogue of "Vincent" switch- and fuse-gear. Reduced prices are shown in most instances.

The EDISON SWAN ELECTRIC CO., LTD., 123-5, Queen Victoria Street, London, E.C.4.—Publications C.L. 647, 651 and 686, dealing respectively with "Ediswan" floodlight projectors, day and night electric signs, and weatherproof lanterns and street-lighting equipment.

Prices of Materials

The following prices are only general, and they may vary according to quantities and other circumstances:—

	CHEMICALS, &c.	Price June 23rd.	Fortnight's inc. or dec.
a	Acid, Oxalic ... ... per lb.	5½d.	...
a	Ammoniac, Sal ... ... per ton.	£60	...
a	Ammonia, Muriate (large crystal) ,,	£52	...
a	Borax ... ... ,,	£17	...
a	Copper Sulphate ... ... ,,	£25 10s.	...
a	Potash, Chlorate ... ... per lb.	3d. to 4d.	...
a	,, Perchlorate ... ... ,,	5½d.	...
a	Shellac T.N.... ... ... per cwt.	£4 5s.	...
a	Sulphur, Commercial ... ... ,,	£11	...
a	,, Roll ... ... ,,	£11	...
a	Soda, Chlorate ... ... per lb.	3d.	...
a	,, Crystals ... ... per ton.	£5 to £5 5s.	...
a	Sodium Bichromate, casks ... per lb.	3½d.	...
	METALS, &c.		
b	Aluminium, Ingots ... ... per ton.	£85 to £90	...
b	,, Wire ... ... per lb.	1/1 to 1/9	...
b	,, Sheet and Foil ... ... ,,	1/1 to 2/9	...
b	Babbits Metal and Anti-friction Metals—		
	Grade I ... ... per ton net.	£104	£1 Inc.
	Grade II ... ... ,,	£75	£1 Inc.
	Grade III... ... ... ,,	£45	...
c	Brass (rolled metal 2' to 12' basis) per lb.	7d.	¼d. dec.
c	,, Tubes (solid drawn) ... ,,	9d. to 9¼d.	¼d. dec.
c	,, Wire, basis ... ... ,,	7½d.	¼d. dec.
c	Copper Tubes (solid drawn) ... ,,	10d.	¼d. dec.
g	,, Bars (best selected) ... per ton.	£67	
g	,, Sheet ... ... ,,	£67	£3 dec.
g	,, Rod ... ... ,,	£67	
d	,, (Electrolytic) Bars ... ,,	£49 12s. 6d.	...
d	,, ,, Sheets ... ,,	£143 10s.	...
d	,, ,, Wire Rods ,,	£59 12s. 6d.	...
d	,, ,, H.C. Wire per lb.	7d.	⅛d. dec.
f	Ebonite Rod ... ... ,,	1/3 to 1/6	...
f	,, Sheet ... ... ,,	1/3 to 1/6	...
h	German Silver Wire ... ... ,,	2/1	...
h	Gutta-percha, fine ... ... ,,	nom	...
h	India-rubber, Para fine ... ... ,,	4½d.	...
i	Iron, Pig (Cleveland No. 3) ... per ton.	58/6	...
l	,, Wire, galve. No. 1, P.O. qual. ,,	£20	...
g	Lead, English pig ... ... ,,	£14 10s.	£2 5s. Inc.
g	Mercury ... ... per bot.	£17s. to £17 10s.	...
a	Mica (in original cases) small ... per lb.	6d. to 3/6	...
a	,, ,, medium ,,	4/- to 8/-	...
a	,, ,, large ... ,,	8/6 to 17/6 & up	...
p	Phosphor Bronze, plain castings ,	1/1½d.	...
p	,, ,, drawn bars & rods ,,	11d.	...
p	,, ,, rolled strip & sheet ,,	11¼d.	...
p	,, ,, wire ... ... ,,	1/0d.	...
e	Platinum ... ... per oz.	£8	...
d	Silicium Bronze Wire ... ... per lb.	9½d.	...
r	Steel, magnet, in bars ... ... ,,	7½d.	...
g	Tin, Block (English) ... ... per ton	£110 to £111	£8 Inc.
n	Wire, Nos. 1 to 16 ... ... per lb.	2/11d.	...

*For 1 cwt. lots. Special quotations against definite specifications.

Quotations supplied by

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India-Rubber, Gutta-Percha and Telegraph Works Co., Ltd.
g James & Shakespeare.
h Edward Till & Co.
i Bolling & Lowe.
l Richard Johnson & Nephew, Ltd
n P. Ormiston & Sons.
o Johnson, Matthey & Co.,
p C. Clifford & Son, Ltd.
r W. F. Dennis & Co.

Dissolution of Partnership

H. C. TAPLIN & SONS, electrical and general engineers, 27, South Front, Southampton.—Mr. N. H. Taplin and Mr. B. E. G. Taplin have dissolved partnership. Mr. N. H. Taplin will attend to debts and carry on the business.

Bankruptcy Proceedings

W. G. LESLIE, electrician, (trading as the Carlisle Ignition Co.), St. Paul's Square, Carlisle.—The adjourned public examination was held recently at the Court House, English Street, Carlisle. According to the statement of affairs submitted, there were liabilities amounting to £1,268 against assets of £534, thus leaving a deficiency of £734. The examination had been adjourned for a thorough examination of the accounts of the debtor since the fire at his premises in November, 1929. The Official Receiver now stated that the debtor had handed in a rough statement of cash received and a statement of its application. These statements had received some examination at his office and he thought that the debtor's cash book would have to be re-compiled, and saw no useful purpose in resuming the examination that day. The examination was therefore further adjourned.

F. W. CASSELL, electrician (trading as F. W. Cassell & Co.), 164, Park View Road, Welling, Kent.—The public examination was conducted at the Court House, Eastgate, Rochester, recently. The debtor had prepared a statement of affairs which showed liabilities of £322 against assets of £16, leaving a deficiency of £306. He attributed his position to "heavy overhead charges, loss on contract work, due to under-estimating and insufficient business." The examination was closed.

S. J. H. RALPH, radio engineer, 77, Clapham Road, Lowestoft.—Receiving order made June 16th on debtor's own petition.

R. E. LOMAS (R. E. Lomas & Co.), electrical and radio engineer, 24, Tower Street, King's Lynn.—Receiving order made June 11th on debtor's own petition. First meeting, June 26th, and public examination, July 16th, both at the Court House, King's Lynn.

B. L. COX, electrical engineer, Holmes Yard, Shirland Street, Chesterfield.—Last day for receiving proofs for dividend July 4th. Trustee: Mr. L. Barnes, 73, Saltergate, Chesterfield.

W. H. SAYERS electrical engineer, 14, Rectory Road, Beckenham.—Receiving order made June 12th, on a creditor's petition.

H. D. SMITH (Standard Radio & Electrical Co.), factor, 4a, Alpha Road, Surbiton.—Trustee: Mr. C. Latham, 78, New Oxford Street, W.C., appointed June 12th.

J. R. KIRK, electrical engineer, 2, Park Villas, Malden Road, Cheam.—Last day for receiving proofs for dividend July 4th. Trustee: Mr. C. R. Waterer, 29, Russell Square, W.C.1.

R. SMITH and D. A. SMITH (D. A. Smith & Co.), wholesale wireless dealers, 41, Skerton Road, Old Trafford, Manchester.—First and final dividend of 2¼d. in the £, payable June 29th at the Official Receiver's Offices, Bryrom Street, Manchester.

Company Liquidations

LIGHT O'DAY ELECTRIC LAMP COMPANY (1927), LTD., 283, High Holborn, W.C.—Under the compulsory liquidation of this company accounts have been lodged showing liabilities £2,301, assets £536, and a deficiency of £10,955, with regard to contributories, the issued capital being returned at £9,190. The company was registered on March 1st, 1927, for the purpose of carrying on business as an electric lamp company, and exploiting the manufacturing and selling rights in the United Kingdom of the "Oriona Daylight" electric lamps. Very little business was, however, done between March, 1927, and September 30th, 1929, and the turnover for this period amounted to about £664 and the expenses to £2,450. On December 3rd, 1929, the company entered into an agreement with the Omega Lamp Works, Ltd., under which the Omega Company agreed to supply the company with vacuum lamps marked "Light O'Day" for treatment by the company's process and for re-sale at competitive prices. From July, 1930, the life of the company had been prolonged with loans by the directors. The trading accounts show total losses of £4,851 between March 1st, 1928, and September 30th, 1930. The failure of the company is attributed to lack of capital. Mr. Archibald Garner-Stevens, 6, Broad Street Place, E.C., has been appointed liquidator.

RADIO ELECTRIC CO. (BOURNEMOUTH), LTD.—First and final dividend of 3s. 2¼d. in the £, payable June 29th at the Official Receiver's office, Midland Bank Chambers, High Street, Southampton.

NORTHERN ELECTRIC WIRE CO., LTD.—Winding up voluntarily. Liquidator: Mr. B. H. B. Eldridge, 52, Brown Street, Manchester.

Winding-up Order

SUN RAY ELECTRIC LAMP CO., LTD.—Mr. Justice Maugham, in the Companies Court on Monday last, made an order for the compulsory winding-up of this company. Mr. Wynne Parry, who supported the petition, said it had been twice adjourned, and on the last occasion it was suggested that some proposal would be made, but this had not been done, and he asked for the usual order. Mr. Winterbotham, for the company, said he could not oppose.

Winding-up Petition

ELTAX (BRITISH), LTD.—A petition for the winding up of this company has been presented to the High Court by Hillbar Press, Ltd., and will be heard in London on June 29th.

Meeting of Creditors

CARRARA-VERSILLA ELECTRIC RAILWAY & POWER CO., LTD.—Creditors' meeting, June 30th, at Queen's House, 28, Kingsway, W.C.2.

Electricity Supply

Lighting, Domestic, Power

Australia.—OPENING OF NEW TASMANIAN POWER STATION.—The new hydro-electric power station on the Shannon River, Tasmania, was put into operation last month by Mr. McPhee, the Prime Minister. The station, which has cost about £400,000, has a generating capacity of 15,000 h.p., and was required to meet the growing demand for power in all parts of the state, including the requirements of the Electrolytic Zinc Co. for an additional 13,000 h.p. It will be controlled automatically. The capital cost of the State hydro-electric department is now about £3,750,000, the output being approximately 80,000 h.p.

Aylesbury.—PRICE REDUCTIONS.—The Town Council has adopted the following reduced tariff for shops, and business and combined premises:—In the borough, a reduction from 8s. to 7s. per 25 W of demand per annum, and in the rural area a reduction from 10s. to 8s. per 25 W. In the whole area of supply, for the application of 5 per cent. reduction in the demand charge, 800 W to be substituted for 1,000 W. Where the demand exceeds 3,000 W a reduction of 15 per cent. in the demand charge will be made, and where the demand exceeds 6,000 W a reduction of 20 per cent.

UNEMPLOYMENT RELIEF SCHEMES.—Works of transmission and distribution to cost £9.734 are to be put in hand next winter, subject to an unemployment grant being secured.

Barnes.—MAINS EXTENSIONS.—The Urban District Council has decided to extend the mains on the Cedars estate, East Sheen, which is being developed by the erection of shops and flats.

Barnstaple.—SPECIAL ORDER.—The Electricity Commissioners have informed the Rural District Council that an Order is to be granted to the Bideford and District Electric Supply Co. for the parishes of Atherington, Bishopstawton, Fremington, Horwood, Landkey, Newton Tracey, Swimbridge and Tawstock, subject to a protection clause for the Barnstaple Corporation. At the suggestion of the Commissioners the Council has decided to withdraw its objection to the Order.

Bedford.—ASSISTED WIRING.—With regard to the rural electricity scheme the Corporation Electricity Committee has decided to arrange a schedule for assisted wiring so that local contractors may undertake the work, the rates ranging from 19s. per point in small houses to 17s. per point in larger premises.

Bingley.—SHOWROOM SCHEME SANCTIONED.—The Electricity Commissioners have approved a scheme of the Urban District Council for the erection of new electricity showrooms and offices in Main Street, and sanction has been given to borrow £3,700.

Bolton.—YEAR'S WORKING.—The accounts of the Corporation Electricity Department (engineer and manager: Mr. H. E. Annett) for the year ended March 31st last show a total revenue of £291,532 and a working expenditure of £144,019, leaving a gross profit of £147,513. The corresponding figures for the preceding year were: Total income, £305,065; working expenses, £144,545; gross profit, £160,520. To the gross profit was added bankers' interest making a total of £148,022 available and, after providing for interest on loans (£54,862), income-tax (£6,750), loan repayment (£51,901), and depreciation and renewals (£5,000), there was a net profit of £29,509, as compared with £39,736 in the preceding year. Capital expended during the year totalled £43,296, the principal item being £21,370 for mains. The total capital expenditure on the undertaking now stands at £2,064,837. Electricity sold decreased from 66,021,956 to 59,439,790 kWh, energy for power falling by 7,843,342 kWh. Private lighting supplies showed a slight increase, while combined lighting and heating consumption rose from 5,098,287 to 6,356,783 kWh. The maximum supply demanded decreased from 31,980 to 26,820 kW. The average price obtained per kWh was 1.05d., as compared with 1.08d. in 1929-30.

Brampton.—INAUGURATION OF SUPPLY.—A supply of electricity provided by the Carlisle City Council was inaugurated on June 12th. There are about 100 consumers connected up, and a supply to Longtown will follow shortly.

Canada.—THE ST. LAWRENCE POWER SCHEME.—The trustees of the New York State Power Authority are visiting Toronto to confer with officials of the Ontario Hydro-Electric Commission regarding plans for power developments on the St. Lawrence River. The general project involves the development of from five to six million h.p. of hydro-electric energy, as well as the construction of a deep waterway to the tidal water at Montreal for vessels of a minimum draught of 24 ft. The total expenditure is estimated at approximately 600,000,000 dollars (£120,000,000). It is, however, considered unlikely that any definite agreement between Canada and the United States will be reached this year, although the ultimate construction is practically assured.—*Reuter* (Ottawa).

Chorley.—LIGHTING OF COUNCIL HOUSES.—The Rural District Council has decided to have electric lighting installed in the Council houses at Charnock Richard.

Congleton.—PROPOSED SUPPLY TO BUGLAWTON.—The Town Council has decided to make a canvass at Buglawton, after the assisted-wiring scheme has been put into operation, with a view to supplying the urban area.

Continental.—FRANCE.—The recently-issued report of the French Ministry of Public Works regarding the production of electricity in France during 1929 shows that the aggregate output amounted to 14,327 million kWh, as compared with 12,976 million kWh in 1929, an increase of just over 10 per cent. Of the total, 8,202 million kWh was produced at stations operated by steam or internal combustion engines, and 6,125 million kWh by hydro-electric plants.

La Compagnie Générale Industrielle, of Paris, has recently secured a concession to establish a hydro-electric station to utilise the Canitrot Falls on the River Cérou, near Almayrac, in the Tarn Department.

ITALY.—According to *L'Energia Elettrica* the capacity of the electric power stations in operation in Italy at the end of March last amounted to 4,347,000 kW, as compared with 4,109,000 kW at the corresponding date of 1930, an increase of 5.79 per cent. Of the total, hydro-electric plants are responsible for 3,568,000 kW and steam and internal-combustion engine stations for 729,000 kW. The output of electricity in Italy during the three months ended March last is estimated at 2,225,964,000 kWh, as against 2,388,794,000 kWh in the corresponding quarter of 1930, a decrease of 6.82 per cent.

NORWAY.—The Norsk Kraft Export, A.S., has been formed in Oslo for the purpose of developing the possibilities of the export of electrical energy to other countries. The investigations will comprise the technical, economic, legal, and financial sides of the question. In these directions it is stated that the promoters of the company have obtained the co-operation of the Danish Ministry of Labour, the Water Power Administration Board in Sweden, and the German central organisation for the supply of power, the Elektrowerke.

BELGIUM.—As from August 1st next the charges for electricity from the municipal power stations in Brussels are to be reduced to 2 fr. 10 c. (just under 3d.) for lighting, to 1 fr. 5 centimes (1.44d.) for power purposes, and to 75 centimes (just over 1d.) per kWh for power for domestic purposes between 10 p.m. and 7 a.m.

Croydon.—IMPROVEMENT OF SUPPLY.—The Corporation Electricity Committee is to improve the supply to the Eagle Hill district at a cost of £1,227.

Culmstock (Devon).—STREET LIGHTING.—It was decided at a public meeting held at Culmstock recently that the streets should be lighted by electricity.

Dartford.—MAINS EXTENSIONS.—The Urban District Council has decided to extend mains to the Baldwyns estate at an estimated cost of £5,465; these mains will also be available for a supply to the Bexley mental hospital. The completion of the ring main scheme by laying a cable to Temple Hill and the erection of a kiosk at a cost of £1,664 is also recommended by the Electricity Committee.

TARIFF REVISIONS.—The Urban District Council Electricity Committee recommends the revision of various power and heating tariffs which will give concessions to consumers estimated at £1,300 per annum.

Dornoch (Sutherland).—ELECTRICITY SCHEME.—A public meeting was held on June 15th to consider a scheme submitted by the Grampian Electric Supply Co. for the supply of electricity in the borough, and it was decided to appoint a committee of six ratepayers and three members of the Corporation to collect information and submit it to an expert.

Douglas (I.O.M.).—LOAN SANCTIONED.—The Tynwald Court has authorised the Town Council to borrow £10,400 for mains extensions, services, public lamps, meters, cookers, &c., and to organise a scheme of assisted wiring.

Harrington.—ELECTRICITY SUPPLY.—The Urban District Council has received an intimation to the effect that the Mid-Cumberland Electricity Co., of Leeds, has been formed to undertake the supply of electricity in the district under the Mid-Cumberland Order of 1930, and that Mr. R. E. Gamble had been appointed the local representative to deal with inquiries from prospective consumers.

Hungerford.—ELECTRICITY SUPPLY.—The Rural District Council has been informed by the Wessex Electricity Co. that it is its intention to link up all the villages in the area, and that its expenditure this year on developments will be £300,000.

Lichfield.—EXTENSIONS.—The City Council has received sanction to extend mains to Alrewas and Fradley, and is to commence work forthwith.

Llandrindod Wells.—PROPOSED BULK SUPPLY.—The Urban District Council is proceeding with negotiations with the Shropshire, Worcestershire and Staffordshire Electric Power Co. with regard to a bulk supply. If these fail, application will again be made for a loan for additional plant.

London.—BATTERSEA.—The Borough Council Electricity Committee is to provide electricity services to 125 premises at a cost of £1,116, replace old distributors with armoured cable at a cost of £3,174, and extend mains at a cost of £500.

Sanction has been received to the borrowing of £30,000 for mains and services, and £20,553 for plant.

STOKE NEWINGTON.—The Borough Council is to consider further a recommendation from the Electricity Committee for the extension of the electricity undertaking at a cost of £33,773.

The accounts of the electricity undertaking for 1930-31 show a net profit of £5,625.

SHOREDITCH.—The Minister of Transport is to hold an inquiry into the application of the Borough Council to supply electricity to the premises of the London and North-Eastern Railway Co. in the High Street.

In connection with the Faraday Centenary Celebrations, the Electricity Committee recommends the floodlighting of Shoreditch Church, the public library and baths at a cost of £200.

FULHAM.—The Borough Council Electricity Committee recommends the erection of sub-stations in Hurlingham Road, May Street, and at the rear of the South Branch Library, at an estimated expenditure of £19,897. The laying of new mains costing £12,909 is also recommended, as well as the provision of cables, a sub-station and equipment, at a cost of £9,435, for the supply of buildings to be erected on the Swan Brewery housing estate.

HACKNEY.—The expenditure of £2,200 on cable work, transformer kiosk and equipment, required to give a supply to Messrs. I. Griew & Co., Ltd., of Waterden Road, E.9, is recommended by the Borough Council Electricity Committee.

HAMMERSMITH.—The Borough Council Electricity Committee recommends the provision of an additional supply to the Osram-G.E.C. Lamp Works, Brook Green, at an estimated cost of £1,468.

Lyme Regis.—PROPOSED DISPOSAL OF UNDERTAKING.—The Town Council has instructed the town clerk to communicate with a company with a view to the disposal of the electricity undertaking at an acceptable price. The present charge for lighting supplies is 1s. per kWh.

Macclesfield.—CORPORATION TO PURCHASE UNDERTAKING.—The Corporation has decided to purchase the local electricity undertaking for £223,000.

Minehead.—PUBLIC LIGHTING.—The Urban District Council has accepted the tender of the Minehead Electricity Supply Co., Ltd., for the public lighting of the whole of the town for a period of seven years at a cost of £1,071 per annum, with a payment of £571 towards the conversion of the gas lamps.

Northern Ireland.—BELFAST.—The Minister of Commerce has given his consent to the erection by the Corporation of overhead lines, and has sanctioned the borrowing of a sum not exceeding £55,742 for the purpose.

SUPPLY TO ARMAGH AND DOWN.—The Minister of Commerce proposes to enter into a contract for the erection of h.p. transmission lines from the Belfast Corporation's power station at the harbour for the purpose of supplying electricity to various areas in the counties of Armagh and Down.

Oldham.—THE SLACKS VALLEY STATION.—It was reported at the June meeting of the Town Council that the expenditure on the Slacks Valley generating station was £43,737 less than the original estimate of £566,475, and that of the loan sanctioned there was an outstanding balance of £34,749.

Portland.—EXTENSIONS.—The Urban District Council Electricity Committee is to extend its supply of electricity to the Grove, Weston and Southwell areas at a cost of £15,000.

Portsmouth.—INSUFFICIENT PLANT.—The Corporation Electricity Committee has received a report from its engineer and manager stating that it will not be possible to meet the estimated demand in the winter of 1932-33 with the existing plant and the new boilers proposed to be installed, unless the Central Electricity Board can give a supplementary supply by that time. With the object of ascertaining the intentions of the Board the town clerk has been authorised to make formal application for sanction to the extension of the generating station by the installation of another 20,000-kW generating set.

Preston.—SUPPLY TO ELSWICK.—The Corporation Electricity Committee has received sanction to the borrowing of £2,000 for the purpose of extending the electricity supply to Elswick.

Price Reductions.—Reductions in the charges for electricity have been made or recommended in the following districts:—

KINGSTON-ON-THAMES.—General lighting: From 5d. to 4d. per kWh for the first 8,000 kWh; next 12,000 kWh, 3½d.; next 24,000 kWh, 3d.; beyond, 2½d. Lighting through prepayment meters: From 6½d. to 5d. per kWh. Power: First 6,000 kWh from 2½d. to 2d.; above 6,000 kWh as at present. Hire of electric cookers: A reduction of 50 per cent.

FAVERSHAM.—Lighting and power: A reduction of ½d. per kWh. A new tariff for domestic power at 2d. per kWh has been introduced, as well as a rebate of 5 per cent. to power consumers on all quarterly accounts of £1 and upwards.

Sheffield.—MAINS EXTENSIONS.—The Corporation Electricity Committee is to extend mains at a cost of £2,500.

Southend-on-Sea.—PROMENADE LIGHTING IMPROVEMENTS.—The Town Council has adopted a scheme for the laying of h.p. mains along the esplanade for improving the lighting at an estimated cost of £15,858, including the necessary kiosks and switchgear.

South Africa.—CHANGE-OVER SCHEME.—The Vryheid (Natal) Town Council proposes to change over the electricity system from d.c. to a.c. and to erect a new power station.

Swansea.—MAINS EXTENSIONS.—The Corporation Electricity Committee is to extend mains to Fforestfach Garden City at a cost of £960.

Tynemouth.—VOLTAGE REGULATORS.—The Corporation Electricity Committee has authorised the installation of voltage regulators at sub-stations at a cost of £900.

Ventnor (I. of W.).—PUBLIC LIGHTING.—The Urban District Council has accepted the offer of the Isle of Wight Electric Light and Power Co., Ltd., for public lighting on a five-year contract at £773 per annum.

Warrington.—LOAN SANCTIONED.—The Corporation Electricity Committee has obtained sanction to a loan of £20,000 for mains and services.

Whitchurch (Salop).—INAUGURATION OF SUPPLY.—A supply of electricity given by the North Wales Power Co. was switched on recently by Mrs. Harold Smith, wife of the chairman of the Urban District Council. There are already 133 consumers.

Wigton.—ELECTRICITY SUPPLY CONFERENCE.—The Urban District Council has invited the Aspatria Urban and Wigton Rural District Councils to appoint deputations to join in a conference on the supply of electricity for the three districts.

Yeovil.—ELECTRICITY SUPPLY.—The South Somerset and District Electricity Co., Ltd., is to supply electricity to 346 houses on the Urban District Council's housing estates. Permission has also been granted to the Wessex Electricity Co. to supply electricity for other Council housing schemes.

Traction

Carlisle.—PURCHASE OF TRAMWAYS.—The Ministry of Transport has sanctioned the purchase by the Corporation of the tramway service in the city, which is controlled by the Carlisle and District Transport Co.

Continental.—FRANCE.—As in the case of London, so in Paris a scheme is being promoted for the concentration of the transport systems. At present the systems are controlled by two companies which hold concessions from the City Council of Paris. The first is the Metropolitan Railway Company, which about two years ago took over the other underground line (Nord-Sud), and the second is the Compagnie des Transports en Commun de la Region Parisienne. Notice to determine the agreement with the latter company was given by the City Council last year, which has since sought for a new concessionaire for this undertaking. Four competitors have come forward for this purpose. These include the old company and the Metropolitan Railway Company in the form of a subsidiary termed the Compagnie Metropolitaine des Autobus et des Tramways. In the course of a report on the subject, the prefect of the Seine recommends that the tramway and omnibus concession should be entrusted to the Compagnie Metropolitaine, which would permit of the possibility of a closer connection between the various means of transport and the underground railway. It is considered that this recommendation will probably be adopted as it would establish a single control for the whole of the transport system.

A somewhat novel form of oil-electric motor 'bus has recently been constructed by a French engineering firm. The vehicle itself, which is of the usual single-deck type, is equipped with an electric motor together with the necessary transmission and control gear only. The power unit proper, which consists of a Diesel oil engine and a dynamo, is mounted on a light two-wheel carriage which trails behind the 'bus, a flexible conductor connecting the generator with the electric motor.

SWITZERLAND.—Plans are under consideration for the electrification of the Swiss South-Eastern Railway. The work is estimated to cost between £160,000 and £200,000.

GERMANY.—It is expected that the electrification of the Munich-Nannhofen-Augsburg line will be completed shortly, after which the reconstruction of the Augsburg-Stuttgart section will be commenced. Negotiations are also in hand with regard to the electrification of the Stuttgart-Karlsruhe and Karlsruhe-Mannheim sections, so that it is possible that by the beginning of the fiscal year 1932-33 the entire stretch between Mannheim and Salzburg (Austria) will have been electrified. Up to the end of 1930 only about 3 per cent. of the German railway system was electrified. Bavaria now possesses 430 miles of electrified railways, Baden nearly 30 miles, Southern Silesia 216 miles, the Central-German lignite district nearly 117 miles, and the Berlin and Hamburg inter-urban lines 166½ miles.

GREECE.—According to the *Financial News*, negotiations have been in progress between the Greek Government and the Power and Traction Finance Co., Ltd., a British concern, for the electrification of the local railway between Athens and Kiphissia. It is understood that a contract will be signed shortly.

Irish Free State.—THE DRUMM BATTERY PROPELLED TRAIN.—The laying of the cable for the charging of the Drumm battery has been begun by the Free State Electrical Supply Board at Bray. The cable will be used in connection with the Drumm battery propelled train which it is expected will be ready by August.

Leeds.—HEATING OF NEW TRAMS.—The Corporation Tramways Committee is considering a scheme for equipping new trams, to be put in service before the end of the year, with electric radiator heating under the seats.

London.—HIGH-SPEED ESCALATORS.—High-speed escalators, capable of a speed of 180 ft. a minute, have been installed at Highgate underground station. At present a speed of 100 ft. a minute is being used but in a few weeks this will be increased to 125 ft. or more.

TRAFFIC SIGNAL BELLS.—The automatic traffic control light signals, which are shortly to be put into operation in Oxford Street, will be augmented by an electrically-operated bell system.

Middlesbrough.—THE FUTURE OF THE TRAMWAY UNDERTAKING.—An early decision is likely to be reached with regard to the Corporation's proposal to sell its tramway undertaking to the London & North Eastern Railway Co., Ltd.

Newcastle-upon-Tyne.—PROPOSED PROTECTION OF TRAMWAY UNDERTAKING.—In order to protect the municipal tramway undertaking the Corporation is to ask the Northern Area Traffic Commissioners to grant an application which will provide that no public vehicles shall be allowed to pick up or discharge passengers in the area served by the tramway undertaking.

Nottingham.—RAILLESS CARS.—It is anticipated that the first section of the scheme for the conversion of the Nottingham tramways to the railless-car system will be put into operation in August.

Stretford.—TRAMWAY LEASE.—The Urban District Council proposes to grant a lease to the Manchester Corporation for the operation of the Stretford tramways until March 31st, 1947.

Warrington.—RE-LAYING OF TRAMWAY TRACK.—The Corporation Transport Committee has decided to re-lay the tramway track between Wall Lane and Thelwall Lane.

Telegraph and Telephone

Australia.—TASMANIAN TELEPHONY.—In its report on telephone communication between Tasmania and the mainland, which has been tabled in the House of Representatives, the Public Works Committee stated that undisclosed benefits which would result from this service would tend to increase revenue in indirect ways. The project was an even better financial proposition than it now appeared. When funds could be conveniently made available, therefore, the committee was unanimous in recommending that a submarine cable be laid from Lorne, *via* King Island, to Stanley, to connect the systems of Tasmania and the mainland. The cost would be £180,800.

Brazil. — TELEGRAPH DECREES. — The British Commercial Secretary at Rio de Janeiro reports that Decrees Nos. 19,881 and 19,883 of April 17th, 1931, establish conditions governing the operation of internal and international telephony and telegraphy. The telegraph decree, calling attention to the absence hitherto of any national law on the subject, restricts the internal service to the Federal Telegraph Department and the National Railways, except in so far as the cable companies have existing rights by concessions, which will not be renewed. The Federal Government may grant permission "without privilege or monopoly" to national or foreign companies for national services, says the *Board of Trade Journal*, and British interests are being dealt with by the British Ambassador at Rio de Janeiro.

Canary Islands.—TELEPHONY.—The British Postmaster-General announces that telephone communication, which has hitherto been restricted to calls to and from London, is now available from all parts of Northern Ireland, England, Scotland, and Wales to any place in the islands of Grand Canary and Teneriffe. Calls from the Isle of Man and Northern Ireland are subject to an additional charge.

SWEDISH SERVICE.—A regular service of telephone communication has lately been established between Sweden and the Canary Islands.

International Telephony.—SWEDEN-SIAM.—Sweden is now in telephone communication with Siam. The first conversation was quite successful, the price for a three-minute talk being Kr. 94.20.—*Reuter's Trade Service.*

GERMANY-RUMANIA.—Regular telephone communication service has lately been opened between Berlin and Bucharest, Rumania.

South America.—TELEPHONY EXTENSIONS.—Before the end of the year Bogotá will be placed in telephone communication with the capitals of Brazil, Chile, and Argentina. In the Colombian and Chilean cities of Bogotá and Santiago two more wireless telephone transmitting stations and two receiving stations will shortly be completed, and in Argentina the equipment for a new circuit is almost finished in the Buenos Aires suburbs of Platanos and Hurlingham. Owing to favourable arrangements with international wireless and land-line organisations five of the ten South American States will soon be brought into communication.—*Reuter's Trade Service.*

U.S.A.—WEATHER INFORMATION.—The aeronautics branch of the U.S. Department of Commerce is working on the development of a radio supplement to the automatic telegraph-typewriter system used on airways for transmitting weather information to the various stations along a line of flight. The application of radio to the automatic telegraph-typewriter circuits will have a number of obvious advantages, making it possible to extend service to outlying stations without establishing additional circuits; also, in the event of a part of an automatic telegraph-typewriter circuit going temporarily out of commission, the gap could be effectively bridged by radio without causing serious interruption of the service, which would be of evident importance in bad weather.—*Reuter's Trade Service* (New York).

Radio

Germany.—LICENCES.—On March 31st last there were 3,731,681 radio listeners in Germany. Compared with the figures published on December 31st these figures show an increase of 6.3 per cent., and compared with the figures for the previous year the increase is 15.2 per cent.

NEW STATION.—The Bavarian section of the German Ministry of Posts has decided to erect a high-power station close to Munich, one of eight at present being built in Germany, of which three are already in operation, Heilsburg, Mühlacker, and the new Königs Wusterhausen. It will probably be ten miles due east from Munich and will be ready for tests about May, 1932.

Holland.—HOTEL INSTALLATION.—The new Atlanta Hotel at Rotterdam has been wired and equipped to provide a complete radio and musical service. A central control room serves the various restaurants and dance floors, while each guest room has a loud-speaker and switch for choice of alternative programmes, gramophone music, or the hotel's own orchestras; microphone communication also serves to convey information and general announcements to guests.

The installation consists of 10-watt and 50-watt amplifiers, two radio-gramophones, and two radio receivers. Two amplifiers govern the microphones in the restaurant and ballroom and two amplifiers serve speakers installed in the bedrooms. The receivers are of the all-electric Philips 4-valve type 2511, each connected to an outside aerial, which can be used for both receivers. Precautions have been taken to make reception free from any outside interference. For the relay of programmes to bedrooms a 10-watt amplifier is used, but the same programme, when passing forward to the ballroom and restaurant, goes through a 50-watt amplifier before being reproduced by Philips moving-coil speakers. Messrs. Philips have installed a smaller type of the same system at Queen's Court, Bayswater, London.

Licences.—FURTHER INCREASE.—The number of receiving licences issued by the Post Office increased by 38,056 from 3,672,886 on April 30th to 3,710,942 on May 31st, excluding 23,211 licences issued free to the blind.

The World's Listeners.—RELAYING.—It is estimated that over one hundred million people in the world listen-in every night; this number, however, does not include Russia. In Europe, according to the *Morning Post*, Denmark heads the list of listeners, the proportion with sets of their own to the total population, last year, being 119.5. Sweden is second in Europe with 78.99, and Great Britain third, with 77.5 per thousand set-owners. The great increase during the last two years of communal listening and the use of wireless exchanges has an important political side, as parties are becoming increasingly conscious of the importance of radio as a means of disseminating propaganda. In Russia the development of communal listening is an integral part of the "Five Year Plan," and it is proposed to establish 120,000 communal listening village points. In Holland 45 per cent. of the listeners are on wireless exchanges.

U.S.A.—SMALLER SETS.—American receiving sets, although destined in most cases to a cramped existence in a three-room apartment, have hitherto been somewhat large; the average number of valves used is seven, compared with three in the average English set, and the cabinets are correspondingly larger. At the radio trade show at Chicago, however, a tendency towards smaller and more compact sets was clearly noticeable. Loud-speakers have been made to fit midget cabinets and, though the console cabinet has by no means lost favour, it is estimated that over half the total sales this year will be of midget sets. The general employment of two "new types" of valve has made it possible for manufacturers to make smaller sets; the pentode eliminates two or three valves and the "variablemu" minimises distortion and thus serves to eliminate to some extent complicated volume control. Sales this year will be about 4,000,000 sets, compared with 3,800,000 in 1930. Radio retailers forecast sales in the various divisions of sets as follows: 420,000 in the 25- to 50-dollar class and 2,100,000 in the 50- to 75-dollar class, these two classes comprising the midgets; 1,000,000 in the 70- to 100-dollar class, 300,000 in the 100- to 150-dollar class, and 336,000 to retail from 15 dollars upwards.—*Reuter's Trade Service* (New York).

RADIO TRANSMITTERS.—According to the Radio Division of the Department of Commerce, amateur radio stations comprise over 80 per cent. of the total number of licensed transmitting stations in the United States. Radio stations required by law to be inspected are as follows: amateur stations, 18,994; ship stations, 2,173; broadcasting, 612; commercial land, 468; experimental and visual broadcasting, 391; commercial aircraft, 215; geo-physical stations, 119; making a total of 22,972. Despite their numerical superiority, amateurs are permitted the use of only 6 per cent. of the available frequencies allocated by international treaty and are granted less than one-fortieth of the entire frequency range assigned by the Federal Radio Commission to that country.

TRANSATLANTIC RELAYS.—As one result of the recent visit of Sir John Reith, the director-general of the B.B.C., to Canada and the U.S.A., it is expected that before next winter the British Broadcasting Corporation will be able to exchange a good deal of programme time with America.

Contract Information

When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisement is given in parentheses below

Contracts Open

Carlisle.—July 17th. Electricity Department. 11,000-V overhead transmission line in connection with a supply to rural districts. (See this issue.)

Cupar.—Fife Joint Asylum Committee. Switchgear, transformers, motors, cables, &c., required to change over the electric lighting and power installation at Springfield Asylum, from d.c. to a.c. Specifications from Mr. A. H. Macdonald, interim clerk and treasurer, Fife Joint Asylum Committee, 12, St. Catherine Street, Cupar. (Deposit £1 1s.)

Denmark.—COPENHAGEN.—July 1st. Lighting Department. Transformers for H.C. Oersted power station. (A. 10944.)*

Dundee.—June 29th. Works Department. Switchboard, booster, and 20-kW steam-driven d.c. generator for Ashludie Sanatorium, Monifieth. Specifications, &c., from Mr. D. H. Bishop, city electrical engineer, Dudhope Crescent Road, Dundee.

Egypt.—CAIRO.—August 24th. Ministry of the Interior. Electric lighting installation for the town of Akhmim, near Sohag. (A.X. 10970.)*

Fife.—July 1st. County Council. Electric lighting installation in 12 blocks of houses. Schedules from Mr. G. B. Deas, architect, Central Chambers, Kirkcaldy.

Glasgow.—June 29th. Electric lighting installation at Cottar Street housing scheme. Specifications from general manager, Electricity Department, 4, West Regent Street.

Grays Thurrock.—July 8th. Electricity Department. Static transformers, h.p. and l.p. switchgear and l.p. cables. (June 19th.)

Lichfield.—July 1st. Staffs. Education Committee. Electric lighting installation at Lichfield Grammar School and headmaster's house, &c. Specifications (deposit £4 4s.) from Messrs. Moffet, Rosher & Mann, consulting engineers, Union Chambers, Temple Row, Birmingham.

London.—CENTRAL ELECTRICITY BOARD.—June 29th. 33,000-V transformers for the North-West England and North Wales Electricity Scheme. (June 5th.)
July 20th. Central indication and telephone equipments for the Mid-East England Electricity Scheme. (June 19th.)
LONDON COUNTY COUNCIL.—July 6th. Wiring and fittings for electric lighting at Pavilion A, Hackney Hospital. (June 19th.)
OFFICE OF WORKS.—July 7th. Wiring for lighting and power at the new Geological Museum, South Kensington. (June 19th.)

Manchester.—June 29th. Electricity Department. Transformers, supervisory control equipment and sub-station switchgear. (June 12th.)

Milford Haven.—July 2nd. Electricity Department. Generating plant. (June 12th.)

New Zealand.—WELLINGTON.—August 27th. Government Railways. Underground telephone cable equipment between Wellington and Paekakariki. (A.X. 10932.)*
August 19th. Post and Telegraph Department. Private automatic branch exchange equipment. (A.X. 10967.)*
August 25th. Public Works Department. Storage battery for Mangahao power scheme. (A.X. 10964.)*

North Riding.—County Council. Automatic traffic control signals at Redcar and Eston. (June 19th.)

Pontardawe (SWANSEA).—July 11th. Rural District Council. Reconstruction of electricity undertaking. (See this issue.)

Ripon.—June 29th. West Riding Education Committee. Electric lighting installation at the Grammar School. Specification from the education officer, County Hall, Wakefield.

Rochdale.—July 7th. Town Council. Electric lighting and power installation at 260 houses, Belfield Hall estate. Particulars from the borough surveyor, Town Hall.

Siam.—BANGKOK.—July 31st. Post and Telegraph Department. Armoured underground telephone cables. (A. 10928 and A.X. 10955.)*

South Africa.—JOHANNESBURG.—July 16th. City Council. Recording voltmeters. (A.X. 10952.)*
July 23rd. Three miles of 6,600-V cable and 25 miles of 660-V cable. (A.X. 10974.)*

Staffordshire.—July 1st. Education Committee. Electric lighting and power installations at several school buildings. (June 12th.)

West Midlands.—July 11th. Joint Electricity Authority. 11,000-V underground cables and l.p. overhead and underground distribution system. (June 19th.)

Whitburn (BATHGATE).—Burgh Council. Electric lighting at 42 houses. Applications to the town clerk, National Bank Buildings, Bathgate.

Wombwell (YORKS.).—July 16th. West Riding Education Committee. Electric lighting installation at new open-air school. Particulars from the education officer, County Hall, Wakefield.

Woodhouse (YORKS.).—June 29th. West Riding Education Committee. Electric lighting installation at the Woodhouse Secondary School (extensions). Specification from the education officer, County Hall, Wakefield.

* Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1.

Contracts Closed

Barnet.—Herts Public Assistance Committee. Accepted:—
Electrical ice-making plant for Barnet hospital (£193).—J. & E. Hall, Ltd.

Bath.—City Education Committee. Accepted:—
Installation of electric light at Walcot school (£63).—J. E. Bentley-Hunt.
Installation of electric light at Southdown school (£344).—H. L. Bush & Co.

Blackburn.—Education Committee. Accepted:—
Electrical work in connection with new schools.—Farquhar and Heys.

Croydon.—Electricity Committee. Recommended:—
Two 200-kVA transformers (£346).—British Electric Transformer Co., Ltd.
Overhauling works battery (£214).—Tudor Accumulator Co., Ltd.

Dundee.—Corporation. Accepted:—
Electric lighting of Corporation housing scheme (£1,557).—A. Fyall.

Ealing.—Borough Council. Accepted:—
Electrical installation at Grange school.—Alpha Manufacturing & Electrical Co., Ltd.

Godalming.—Electricity Works. Accepted:—
Battery renewals (immediate and for the next five years).—Alton Battery Co., Ltd.

Government Contracts.—The following contracts were placed by the various Government Departments during May:—

ADMIRALTY (CONTRACT AND PURCHASE DEPARTMENT).
Motor and generator set.—Laurence, Scott & Electromotors, Ltd.
165-h.p. motor for motor generator set.—Electric Construction Co., Ltd.
Main propelling motors.—General Electric Co., Ltd.
Motor reducer sets.—W. H. Allen Sons & Co., Ltd.
Switchboards.—Whipp & Bourne, Ltd.
Silica w/t valves.—Mullard Radio Valve Co., Ltd.

WAR OFFICE.
Portable secondary batteries and cells.—Pritchett & Gold and E.P.S. Co., Ltd.
Electric bulbs.—General Electric Co., Ltd.
Electric crane.—Sir Wm. Arrol & Co., Ltd.
Spares for generating sets.—Douglas Motors, Ltd.
W/t valves.—Edison Swan Electric Co., Ltd.
Wireless telegraph sets.—Radio Instruments, Ltd.

AIR MINISTRY.
Accumulators.—Fuller Accumulator Co., Ltd.
W/t coils.—H. W. Sullivan, Ltd.
Condensers.—Telegraph Condenser Co., Ltd.
Direction-finding station.—Marconi's Wireless Telegraph Co., Ltd.
Portable flashing beacon.—Chance Bros. & Co., Ltd.
Generators and motor generator sets.—Haslam & Newton, Ltd.
Motor generators.—Rotax (Motor Accessories), Ltd.
Receivers.—Siemens Bros. & Co., Ltd.
Transmitters.—Marconi's Wireless Telegraph Co., Ltd.
Valves.—Edison Swan Electric Co., Ltd.

CROWN AGENTS FOR THE COLONIES.
Cables.—Derby Cables, Ltd.; W. T. Henley's Telegraph Works Co. Ltd.; Siemens Bros. & Co., Ltd.
Generating plant.—Electric Construction Co., Ltd.
Meters.—Ferranti, Ltd.; Geo. Kent, Ltd.
Overhead line materials.—Bullers, Ltd.
Wireless apparatus.—Marconi's Wireless Telegraph Co., Ltd.

GENERAL POST OFFICE.
Protective apparatus.—Phœnix Telephone & Electric Works, Ltd.
Telephonic apparatus.—Automatic Telephone Manufacturing Co., Ltd.; Ericsson Telephones, Ltd.; General Electric Co., Ltd.; India Rubber, Gutta Percha & Telegraph Works Co., Ltd.; Plessey Co., Ltd.; Siemens Bros. and Co., Ltd.; Standard Telephones & Cables, Ltd.; Telephone Manufacturing Co. (1929), Ltd.
Wireless apparatus.—General Electric Co., Ltd.
Cable.—British Insulated Cables, Ltd.; Connolly's (Blackley), Ltd.; Hackbridge Cable Co., Ltd.; Johnson & Phillips, Ltd.; Pirelli-General Cable Works, Ltd.; Standard Telephones & Cables, Ltd.
Porous cells.—Edison Swan Electric Co., Ltd.; Fuller Accumulator Co. (1926), Ltd.; General Electric Co., Ltd.; India Rubber, Gutta Percha & Telegraph Works Co., Ltd.; Siemens Bros. & Co., Ltd.
Secondary cells.—Accumulators of Woking (1928), Ltd.
Loading coils.—General Electric Co., Ltd.; Standard Telephones & Cables, Ltd.
Electric lighting fittings.—Hailwood & Ackroyd, Ltd.
Electric lifts.—A. & P. Steven, Ltd. (Aberdeen telephonic repeater station); Evans Lifts, Ltd. (Mayfair telephone exchange).
Electric light and power wiring (Bayswater telephone exchange).—Electric Power Installation Co.
Radio equipment.—Siemens Bros. & Co., Ltd. (H.M. cable ship *Monarch*); Standard Telephones & Cables, Ltd. (G.P.O. (South), E.C.).
Telephone exchange equipment.—Failsworth & Walkden (Manchester area): Siemens Bros. & Co., Ltd. Urmston (Manchester area): General Electric Co., Ltd. London trunk telephone exchange: Standard Telephones and Cables, Ltd. Bishopsgate tandem (London area): Automatic Telephone Manufacturing Co., Ltd.

Telephonic repeater equipment.—Canterbury: General Electric Co., Ltd.

H.M. OFFICE OF WORKS.

Wiring British Museum repository.—Reed & Partners, Ltd.
Newcastle-upon-Tyne electrical engineering maintenance.—Fletcher Bros.
Mechanical and electrical engineering maintenance, Southampton.—W. Loveless.

Grimsby.—Electricity Committee. Recommended:—
H.p. switchgear (£3,813).—General Electric Co., Ltd.
Transformers (£1,134).—Brush Electrical Engineering Co., Ltd.

Hull.—Electricity Committee. Accepted:—
Supply for 12 months from July 1st, 1931, to June 30th, 1932, of electric kettles, porous pots, dry cells, v.i.r. cables (part), and lamps (part).—Edison Swan Electric Co., Ltd.

Lamp Contract.—A contract for 12 months' supply of gas-filled and vacuum lamps has been placed by H.M. Office of Works with Siemens Electric Lamps & Supplies, Ltd.

Lancaster.—Town Council. Accepted:—
Cable and overhead line to Halton.—British Insulated Cables, Ltd.

London. — EAST HAM. — Electricity Committee. Recommended:—
Cables.—Enfield Cable Works, Ltd.; Liverpool Cable Co., Ltd.; W. T. Henley's Telegraph Works Co., Ltd.
STOKE NEWINGTON.—Electricity Committee. Recommended:—
3,122 rate wheels for prepayment meters.—Measurement, Ltd.
ST. PANCRAS.—Electricity Committee. Recommended:—
Apparatus for testing a.c. meters.—Chamberlain & Hookham, Ltd. (£211); Weston Electrical Instrument Co., Ltd. (£66).
HAMMERSMITH.—Electricity Committee. Recommended:—
Ten 8-way sub-station switchboards of a rupturing capacity of 50,000 kVA (£2,830).—J. G. Statter & Co.
STEPNEY.—Electricity Supply Committee. Recommended:—
Supply during twelve months ending June 30th, 1932:—Meters and demand indicators.—Reason Manufacturing Co., Ltd.
Combined meters and demand indicators.—Aron Electricity Meter, Ltd.
L.C.C. Education Committee. Recommended:—
Wiring and fittings for electric lighting at Huntingfield Road School, Putney (£297).—Alpha Manufacturing and Electrical Co., Ltd.
Wiring and fittings for electricity at Reddins Road School, Camberwell (£459).—Alexander Hawkins & Sons.

Seaham Harbour.—Housing Committee. Recommended:—
Wiring 14 houses on the Carr House estate (£91).—Harrison Bros.

South Africa.—CAPE TOWN.—Electricity Committee. Recommended:—
Two 500-ampere regulators (£364 each).—English Electric Co., Ltd.
Electric light poles (£6,579).—British Insulated Cables (S.A.), Ltd.
Electric lamps.—W. S. Guildford (£696); British General Electric Co., Ltd. (£500).—C. E. Scott, Ltd. (£137); Hubert Davies & Co., Ltd. (£562).
Overhead line material.—British General Electric Co., Ltd. (£587); Griffin Engineering Co., Ltd. (£1,009).
Copper wire.—Cable Engineering Co., Ltd. (£3,688); Associated Engineers Co., Ltd. (£914); British General Electric Co., Ltd. (£253); Steel Trading Co., Ltd. (£261); British Insulated Cables (S.A.), Ltd. (£582).
Switchgear (£8,820).—A. Reyrolle & Co., Ltd.
Fuse carriers, &c. (£667).—Dowson, Dobson & Behr, Ltd.
Stay rods (£673).—British Insulated Cables (S.A.), Ltd.
House service meters.—Associated Engineers Co., Ltd.

Warrington.—Electricity Committee. Accepted:—
Sub-station switchgear.—Harland Engineering Co., Ltd.
One spare exciter armature.—Brush Electrical Engineering Co., Ltd.
Museum Committee. Accepted:—
Wiring old museum.—G. D. Whitham.

Our Service Department

Inquiries must be accompanied by a stamped addressed envelope.

We shall be glad to learn the names and addresses of the makers of the following :—

VIKING vacuum cleaner.
MAJESTIC vacuum cleaner.
COLMANS patent flange and bush for immersion heaters.

Technical Societies' Secretaries

A step towards the co-ordination of the activities of technical societies has recently been taken by the formation of the Association of Secretaries of Engineering Societies in Glasgow. The membership is representative of 17 national societies and the Scottish branches of all the important British societies, and the members have the full support of their respective committees. One of the objects of the Association is so to arrange the dates of meetings of the constituent societies that there shall be the minimum of interference between the various fixtures. It will also keep its members informed of the activities of the different societies, proposes to publish a joint programme of meetings, and to make reciprocal arrangements for attendance at meetings. The convener of the Association is Mr. P. W. Thomas, B.Sc. (Eng.), secretary of the Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow, C.2.

Notes

Electrical Measurement, 1820-1931

As we went to press we received the following communication from Mr. Robt. W. Paul, M.I.E.E. :—

"In connection with the forthcoming Faraday Centenary Exhibition, to open at the Albert Hall on September 23rd, it is intended to show a collection of electrical measuring instruments each of which will illustrate some definite step in the application of the principle involved. Many examples have been promised by the Science Museum, the Post Office, and various universities.

"With a view to making the collection as complete as circumstances permit the writer would be glad to get in touch with any of your readers who may have special knowledge of the whereabouts of other instruments of historic interest, and likely to fill gaps in the series as at present compiled. Approved items could be received at the Science Museum for inspection and arrangement during the month of August. It is not proposed to include instruments which measure, by electrical means, quantities other than electrical."

Chromium-plating Regulations

It will be recalled that last year H.M. Home Office framed a number of regulations which were to be specially applicable to the British chromium-plating industry under the Factory and Workshop Act of 1901. The draft regulations were discussed with representatives of the electro-plating industry, in particular the Standards Committee of the ELECTRO-PLATERS' AND DEPOSITORS' TECHNICAL SOCIETY, which convened a meeting specially to discuss the matter. The regulations have been revised in the light of the suggestions which were forthcoming at that discussion, and the revised draft has now been issued by H.M. Chief Inspector of Factories. The Home Office called for any further objections which the new draft might arouse to be forwarded in writing to him by April 30th, 1931. It is probable that the revised regulations will therefore, with some possible slight amendments, became law.

A new regulation which has been inserted is to the following effect: that employés under the age of 18 are prohibited from working as chromium platers. One of the objections was that the anodic-oxidation process does not come in the same category as chromium plating, since a much weaker solution is used and a lower current density; it was contended that therefore exhaust ventilation was largely unnecessary. On investigation the Factory Department reported that, while the process cannot be excluded from the regulations, exemption may be granted by the chief inspector at his discretion.

Considerable criticism has been made by the industry of the proposed fortnightly medical examination, on the ground that the interval between examinations could be extended without undue hazard, but the Secretary of State does not appear to be willing to agree to any relaxation of this requirement, because chromic acid very rapidly affects the skin and mucous membrane of the nose; but the period between examinations may be extended in cases in which it is found after trial that it can be allowed without increasing the health hazard.

Municipal Tramways

The 30th annual conference of the Municipal Tramways and Transport Association, being held at Southampton from June 24th to 26th, includes, in addition to the presidential address by Mr. R. S. Pilcher and various social functions, two technical papers.

On Thursday a joint paper was read by Messrs. John Barnard, M.B.E. (Bolton), J. F. Cameron (Northampton), and A. R. Fearnley on "the Road Traffic Act, 1930, and the Final Report of the Royal Commission on Transport."

To-day Mr. J. M. Calder (Reading) will speak on "Road Passenger Transport Services." The annual dinner was held at the Western Hotel, Southampton, on Wednesday, and a luncheon was given on board the R.M.S. *Aquitania* on Thursday. Although the conference opened officially on June 24th, an informal reception took place by the president on the evening of June 23rd.

Meter Pivots

In a recent issue of the *Revue Generale d'Electricité*, M. G. Grunberg, of the Compagnie d'Electricité de l'Ouest Parisien, gives the results of the research work carried out in the laboratories of that company in connection with the pivot bearings of electricity meters. In a concluding paragraph he states that the use of pivots made of synthetic jewels (stones) in place of steel pivots has solved the question in an economical and simple way of securing practically an unlimited period of reliable service.

German Electricity Output

A return just to hand shows that the output of the 122 principal electricity supply undertakings in Germany during March last only amounted to 1,266,800,000 kWh, bringing up the total for the first three months of the year to only 3,832,100,000 kWh. as compared with 4,388,300,000 kWh in the corresponding period a year ago.

Accident Prevention in France

The inter-departmental commission appointed some time ago by the French Ministry of Public Works to inquire into, and report upon, means to be adopted to prevent electrical accidents has recently presented its report. It recommends (1) that the Commission, with the addition of representatives of the Ministry of Commerce, of electrical engineers and

artisans, private accident-prevention associations and insurance companies, shall be made a permanent body; (2) that notices should be posted up in all French post offices giving the telephone number of the supply station which should be called up whenever an electrical accident calls for the switching-off of the power. (3) That instruction should be given in schools and at evening classes in methods of dealing with persons struck down by electric shock and that instruction in the methods should be circulated to doctors, chemists, teachers, policemen, and firemen. (4) That, with the object of reducing the number of faulty interior installations, a scheme of granting certificates to qualified wiring men should be introduced. (5) That the proposed permanent Commission should take up as a matter of urgency the question of including in every primary, elementary, and post-school curriculum instruction in such electrical matters that should in these days be generally known. (6) That the public should be officially recommended to see that only fittings bearing an official quality mark be used and that only such stamped fittings be employed by all Government and local authorities. (7) That provision be made for the punishment of persons who contravene safety regulations. (8) That the permanent Commission should draw up a series of leaflets giving hints as to the prevention of electrical accidents both to workmen and the public.

The Ascot Totalisator

The accompanying illustration shows the interior of the machinery room of the all-electric totalisator at Royal Ascot.

In it may be seen the Strowger automatic equipment (for 40 horses) mounted on 37 racks, and on the right the main distributing frame. There are three indicators, one in the machinery room, and the other two (remote-controlled and synchronised) in the paddock and six-shilling enclosure. The interconnection of the external cables from the ticket-issuing machines and the internal wiring of the equipment racks necessitated the employment of some 126 miles of wire. The indicators are on the lamp monogram principle, each containing 616 lamp boxes and nine final post boxes for "win" and "place" indications, respectively, the total number of lamps ("Mazda") per indicator being 14,883, or 44,649 in all. Electricity for the lamps is taken from the mains of the local supply undertaking; the Strowger equipment is operated by electricity from portable storage batteries. The entire installation was designed, manufactured, and installed by the Automatic Telephone Manufacturing Co., Ltd.

Appointments Vacant

Teacher of practical and theoretical electrical installation work for the London County Council.

Chief engineer and manager for Ipswich Electric Supply and Transport Departments. Commercial assistant for Southend-on-Sea Electricity Department.

(See our advertisement pages to-day).

The Electrical Association for Women

On June 16th the North Staffs branch of the E.A.W. and the N.W. Midlands District E.D.A. Circle gathered at the electricity showrooms, Kingsway, Stoke-on-Trent, to hear Mr. Young, of Young, Osmond & Young, Ltd., lecture on the electrical heating of rooms, water, &c.

Swiss Million-volt Installation

One-million-volt testing plant has recently been installed at the works of the Oerlikon Co. in Switzerland. The installation comprises a set of three cascade-connected transformers mounted on insulating supports, the total capacity being 1,200 kVA. One of the poles of the set of transformers is connected to earth, rendering it possible to put the apparatus to be tested immediately under tension without having to insert an insulating platform. The pressure is measured by means of a static voltmeter with spheres 1,000 mm. (39.3 in.) in diameter. The alternator used in connection with the plant is of 360 kVA capacity and is directly coupled to a 320-h.p. synchronous induction motor. The compensating current is supplied by two reactance coils, one of which is adjustable and remotely controlled by means of a servo-motor. A large tank from which the air can be exhausted is provided for the testing of insulating material in oil. The tests are controlled from a switch desk furnished with a supervisory diagram, pilot lamps, and miniature switches, and control is duplicated by a panel near the oil tank.

The Illumination Congress

An attractive programme has just been issued in English, French, and German of the International Illumination Congress, 1931, which is to be held (September 1st to 19th) under the auspices of the International Commission on Illumination and organised by the National Illumination Committee of Great Britain and the Illuminating Engineering Society, London.

Commencing in London, there will be visits to places of interest, gas and electricity undertakings, street and shop lighting, illuminated public buildings, interior cathedral lighting, &c.; trips to Windsor Castle and Hampton Court; also to the port of London, returning to the Tower and Westminster by river to view the illuminated riverside.

On the afternoon of the third day delegates will travel by train to Glasgow where there will be a technical session at the Royal Technical College, alternative visits, a civic reception, inspection of street lighting, and a boat excursion on the Firth of Clyde.

On the Sunday delegates will proceed by train to Edinburgh for a technical session in conjunction with the annual conference of the Association of Public Lighting Engineers at the University. There will be alternative visits, street lighting inspection, and a civic reception and dance at the College of Art. The annual meeting of the Association of Public Lighting Engineers will also be held in Edinburgh and there will be motor trips within the city, whose ancient Castle will be floodlighted.

The party will then go by train to Buxton, whence there will be a day road trip to Sheffield for a civic reception and luncheon, gas company and other visits, returning to Buxton. Next morning there will be a technical session before the party travels by train to Birmingham, where a technical session will be followed by a civic reception, dance, and a demonstration of automobile lighting in co-operation with the Royal Automobile Club.

Following a whole day motor coach trip to Stratford-on-Avon and Shakespeare's country, delegates will travel by train to Cambridge on the second Sunday for a week's plenary session and meetings of the International Commission on Illumination in Trinity College. Sir Arthur Eddington will lecture and the Colleges will be visited.

Finally, the party will return by train to London in time for the commencement on September 21st of the Faraday Centenary celebrations in conjunction with the summer meeting of the Institution of Electrical Engineers.

A special train will be available throughout the tour and accommodation and meals should not cost more than 24s. each per day. Ladies will be registered without fee (which is £2 each member). Registration and hotel reservation forms must reach the hon. general secretary, International Illumination Congress, 1931, at 32, Victoria Street, London, S.W.1, by July 10th at the latest.

Mr. David Wilson and Mr. John Christie at the Scarborough Convention

Centralisation in West Wales

An inquiry was held at the Guildhall, Carmarthen, on June 16th, by Mr. H. Nimmo, chief engineering inspector of the Electricity Commissioners, into the application of the West Cambrian Power Co., Ltd., for Special Orders to supply electricity in certain districts in Carmarthen, Cardigan, and Pembroke. Objections to the application were made by a number of local authorities and interested companies in West Wales, but subsequently some of them during the inquiry withdrew their objections by arrangements with the applicants. On behalf of the applicants, Mr. John Hodson said that the existing supplies were very inadequate and they were obtained from a number of small undertakings operating on a small scale in small districts. Many of the undertakings concerned were small parochial concerns and it was the policy of recent legislation and of the Electricity Commissioners to supersede them in favour of larger undertakings and larger areas. The company proposed to maintain some of the more efficient small generating stations until arrangements had been made to deal with the demand by means of two main stations at Carmarthen and Haverfordwest. The West Cambrian Power Co. would be prepared to purchase local undertakings at a fair price. The inspector intimated that he would visit some of the local undertakings.

Fatality

An inquest was held recently on Arris Filby (25), mechanic, whose death occurred at the South Elmsall Brickworks. It was stated that he went into the elevators to make some repairs carrying an electric cable with a lighted lamp at the end, his hand being round the adaptor. He was later found at the bottom of the pit grasping the lampholder. A witness said he had seen Filby use the same cable and lamp previously without an insulated handle, although there were insulated handles for use. Mr. B. A. M. Cooper, H.M. Electrical Inspector, said be examined the metal lampholder, which had apparently not been taken apart for some time. His opinion was that a loose wire was touching the brass of the holder and conveyed the current to Filby. Medical evidence was that Filby had a small burn on the chest and others at the base of the thumb on both hands. Death was due to electric shock. A formal verdict was returned.

I.E.E. Wiring Regulations (Buildings)

A new clause, which is supplementary to the alterations and additions dated May 15th, 1930, has been inserted after Clause L of Regulation 69 (Distribution Boards) in the ninth edition of the I.E.E. Regulations for the Electrical Equipment of Buildings. The new Clause M states that under certain conditions in an installation in which the distribution board is combined with the main switch, main fuses will no longer be necessary. Copies of the new clause can be obtained free of charge from the secretary of the Institution, Savoy Place, Victoria Embankment, London, W.C.2, for insertion in existing copies of the Regulations.

Institution of Engineering Inspection

The programme of the 1931-32 session of the Institution of Engineering Inspection has now been issued. The meetings will be held at the Royal Society of Arts, London, and among the papers to be read are the following:—October 14th: "Some Applications of Condensers to Electric Power Circuits," by Mr. P. R. Coursey. January 13th: "The Comparative Values of Diesel Engines from the Purchaser's Point of View," by Mr. G. E. Windeler; and May 9th: "A General Survey of the Use of Small Electric Motors for Domestic or Semi-Industrial Appliances, including Ventilating Fans," by Mr. H. J. Elvey. The annual dinner and dance are to be held at the Connaught Rooms on November 4th, and the annual general meeting and election of Council during the last fortnight in March.

Corrosion by Flue Gas

The effects of combustion products upon equipment have been investigated at the University of Illinois, U.S.A., and the following conclusions are reported in *Power*:—

Corrosion is most often present when the sulphur content of the coal is above 2 per cent. No instances of corrosion were found when the sulphur content was below this value. High-sulphur coal does not always produce corrosion. The zone of maximum corrosion is usually that immediately in front of the air preheater intake.

Corrosion is most prevalent from high-ash coals and under those conditions of operation in which a large draught is employed, so that a great deal of flue dust is carried by the gas. In many cases when corrosion is severe trouble is also experienced from the slagging of boiler tubes. The highest metal temperature at which severe corrosion is encountered is about 300 deg. F. Above this temperature the slight corrosion is similar in extent and in type to that which takes place on boiler tubes. The corrosion of preheater tubes is aided by the erosive action of ash particles. It is significant that under the microscope the corroded cross-sectional edges of preheater tubes have a smooth outline, while those of the economiser tubes are rough and pitted. The presence of a zone of high moisture, caused either by a leak or by a steam soot blower, will produce corrosion by gas from almost any type of coal. This localised corrosion takes place in the vicinity of the escaping steam and is distinct from the erosive action of a steam-water jet.

Corrosion in pulverised-fuel systems is never severe, even when the same fuel produces corrosion when fired on a stoker. Differences in the types of construction of economisers and preheaters have shown no great differences in the rate of general corrosion. Protective metallic coatings on the tubes have not withstood the attack. Enamelled tubes will withstand corrosion if mechanical difficulties in their use can be eliminated.

Chromium alloys are at present the best protection against corrosion by flue gas at temperatures below the dew point. Because of their cost it will usually be found expedient to operate above the dew point, even with the sacrifice of a small percentage of efficiency. It is to be hoped that developments in the future will lead to a more satisfactory preparation of the fuel, with the elimination of greater proportions of the sulphur and ash.

A New Departure in Diesel-electric Ship Propulsion

The *Lochfyne*, which made a trial trip in the Firth of Clyde recently, is 215 ft. long, 30 ft. broad, and has a load draught of 7 ft. 6 in. She was built for David MacBrayne (1928), Ltd., by William Denny & Bros. at Dumbarton, and marks a new development in the application of electrical machinery to ship propulsion. For the first time this form of propelling machinery has been applied to a shallow-draft high-class passenger vessel engaged in coastal service. The Diesel-electric system employed enables the whole of the requirements of the vessel, both for propulsion and domestic services, to be economically supplied from the main engines. The *Lochfyne* has been schemed to fit a one-class summer service on the Oban-Staffa-Iona run, and a two-class winter service with passengers and mails on the Clyde between Greenock and Ardrishaig. The cooking arrangements are entirely electrical; the galley, pantry, and the smoke room are provided with exhaust fans, the windlass and capstans are electric, and the steering gear is of the Hele-Shaw electro-hydraulic type.

The propelling machinery includes two main direct-current generating sets, each consisting of a Diesel engine driving one propulsion generator and, in tandem, one auxiliary service generator. Power from the propulsion generators is taken through the necessary switch and control gear to the two propulsion motors, and control is exercised on the bridge, but alternative control from the engine room in communication with the bridge by telegraph or voice tube is also provided. Control of the running of the Diesel engines is exclusively in the hands of the engine-room staff. To allow for the regular operating condition with only one of the main sets in commission, and to provide the skeleton service necessary in port, there is provided a smaller generator driven by a separate engine. The output of this generator is also distributed through the auxiliary switchboard and the machine is arranged to run in parallel with either of the auxiliary generators on the main engines.

The Diesel engines were manufactured by Davey Paxman and Co., Ltd., each of 5 cylinders, with a normal output of 1,000 i.h.p. at 330 r.p.m., of the constant-speed, non-reversing type.

The electrical propulsion machinery and its control gear were supplied by the Metropolitan-Vickers Electrical Co., Ltd. The motors are each rated at 670 b.h.p. at 438 r.p.m. The propulsion generators have a corresponding rating of 540 kW, 520 volts at 330 r.p.m., and of course, have a similar overload capacity. The two motors are shunt-wound machines excited from the ship's auxiliary system through a specially protected circuit. The machines are of the open fan-ventilated type, the air being exhausted through trunking at the shade deck. Special precautions are taken to prevent the ingress of driven moisture to the trunking and machines.

Floodlighting a Norman Castle

The KENT ELECTRIC POWER CO., LTD., has sent us a copy of a *Times* photograph (reproduced herewith) showing the keep of the Norman Castle at Rochester illuminated for the

A Night View of Rochester Castle

Rochester Historical Pageant which is being performed throughout this week. The floodlighting equipment, comprising eleven projectors fitted with 1,000-W gasfilled lamps, was supplied by the Edison Swan Electric Co., Ltd.

Our Personal Column

Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements

Mr. C. H. Yeaman, the city electrical engineer of Stoke-on-Trent, addressed the local Rotary Club on June 15th, taking as his subject the development of electrical research since Faraday's discovery of electromagnetic induction.

Sir A. L. Dickinson has been appointed a director of the Farnham Gas and Electricity Co. in the place of Mr. J. R. Nash.

Mr. and Mrs. H. Meighan

The accompanying picture is reproduced from a photograph taken at the recent annual conference of the E.C.A. of Scotland, which is reported on another page of this issue. It shows the new President, **Mr. H. Meighan,** and his wife. Mr. Meighan, who is connected with the firm of James Meighan & Son, Bridgeton, Glasgow, read a paper at the conference on "Propaganda and the Extension of the Influence of the Association."

Mr. J. Shearman, commercial assistant to the Heston and Isleworth Electricity Department, has been appointed consumers' engineer to the Southend-on-Sea municipal undertaking.

The Bedford Town Council has increased the salary of **Mr. R. W. L. Phillips,** the borough electrical engineer, to £1,285 per annum as from April 1st last, in accordance with the I.M.E.A. scale.

Sir John Reith, Director-General of the British Broadcasting Corporation, arrived home on Saturday last after his five weeks' tour of the United States and Canada.

The Aberdare Urban District Council has increased the salary of **Mr. W. E. Richardson,** engineer and manager of the Electricity and Transport Department, from £550 to £600 per annum.

Mr. F. C. Yapp, who has for many years been associated with the company, has been appointed to the board of Vickers-Armstrongs, Ltd.

Mr. Frank Thompson, general manager of the Christchurch Tramways Board, New Zealand, has arrived in this country on a visit. The Board's representatives here are Messrs. Rabone, Petersen & Co., Ltd., 297-299, Broad Street, Birmingham.

British Empire Scholarships in the Faculty of Engineering, Loughborough College, for 1931-32, have been awarded to Messrs. G. R. J. Wain-Heapy, F. Dossor, H. J. Jenkins, R. J. Gaul, S. Favel, and M. I. F. Green. These Scholarships are open to all British subjects resident in any part of the Empire, and are of the value of £75 per annum. Applications were received from a large number of schools in England, Africa, Rhodesia, Australia, India, and the Federated Malay States.

Mr. Bayford Stone was re-elected president and **Mr. A. G. H. Dent** chairman at the recent annual meeting of the Business Research and Management Association of Great Britain.

The Oersted Medal

The Danish Committee of the International Electrotechnical Commission has presented a medallion, struck to commemorate the work of Oersted, to **Mr. Ll. B. Atkinson,** who was leader of the British delegation to the plenary meeting of the Commission held in Stockholm last year, and was the British delegate to the meetings on nomenclature at which the recommendation to use the name "oersted" as the unit of magnetic field tensity was adopted.

At Callender's annual meeting last week **Sir Tom Callender** reminded the shareholders that the jubilee of the business would be reached next year and he paid a special tribute to **Mr. George Barnard,** the company's Birmingham representative, who had 41 years' service to his credit.

Mr. W. J. Wiles has resigned his position with Philips Lamps, Ltd. His private address is 51, Gleneldon Road, Streatham, S.W.16.

Mr. Herbert F. Collins, one of the managing directors of Premier Electric Heaters, Ltd., left England on June 18th for Vienna to attend the International Rotary Convention.

Obituary

Mr. F. Bailey.—The death of Mr. Frank Bailey on Monday last week, at the age of 72, has caused a breach in the ranks of what younger men will regard as the "old guard" of metropolitan electricity supply engineers. Almost as long as there has been anything doing electrically in London, he has been an outstanding engineer facing the technical problems arising out of the development of electric light and power and domestic supply in the City area. To the remaining friends of those early nineties his loss will be a very real and personal one, while all those associated with him at the City of London Electric Lighting Co. will also miss him greatly.

The late Mr. Frank Bailey
(Photograph by Press Portrait Bureau)

It was only three weeks ago that we reported that the members of the London Electricity Supply Association had met to do honour to their chairman, and to make him a presentation in recognition of his services to the Association since its inception in 1905 as the Conference of Chief Officials of the London Electric Supply Companies. We append to these notes an appreciation from Col. R. E. Crompton, C.B., which outlines the important part which Mr. Bailey played in London's electricity supply. To this we may add that he commenced his career with the Telegraph Construction and Maintenance Co., and later carried out an electric lighting scheme for the Great Western Railway; his association with Mr. J. E. H. Gordon commenced in 1887. Mr. Bailey was among the earliest to recognise the virtues of the steam turbine for electric power stations. He was president of the Institution of Engineers-in-Charge from 1914 to 1920. At the time of his death he was chief engineer and joint managing director of the City of London Electric Lighting Co., Ltd. Col. Crompton's letter is as follows:—

"Mr. Frank Bailey, whose death we all of us most sincerely deplore, was one of the band of pioneers whose services ought to be remembered with gratitude by the supply industry of Great Britain. I first met him when he was working with the late J. E. H. Gordon on the lighting of Paddington station and near-by goods yards by a.c. arc lights. He later on became engineer to Gordon's Whitehall Electric Supply Company, and he designed and was responsible for building the Sardinia Street station and the other Manchester Square station, which eventually became the Metropolitan Company. Later on, after he had become chief engineer of the City of London Company, he developed the great generating station at Bankside, which has always maintained a high reputation for efficiency, and dealt so successfully with the difficult problems of supply to the City of London area.

"He was chairman of the Metropolitan Munitions Committee during the Great War and gave splendid service. He was one of the leading engineers who took part in the negotiations which resulted in the passing of the two Acts of 1925, under which all the London supply companies now operate. His personality and consideration for all who served under him was a striking feature. He was universally beloved by everyone of the staff and workmen of the undertakings under his control, and everyone of us feels the loss not only of a great pioneer, but of a personal friend."

Mr. A. S. Black.—We regret to report that Mr. Arthur S. Black, the borough electrical engineer and tramway manager of Ipswich, died on June 18th at the age of 54. He had held the Ipswich post since 1921; prior to that he was borough electrical engineer and tramway manager at Southport for about 14 years. While he was at Ipswich the undertaking doubled in size, and he was responsible for the successful replacement of the tramways by a trolley-'bus system.

Mr. J. H. Shuttleworth.—Mr. John Henry Shuttleworth, employed in the testing department of the Newcastle-upon-Tyne Electric Supply Co., Ltd., died last week.

Miss E. C. Dudgeon.—The death is reported from Dumfries of Miss E. C. Dudgeon who had carried out experiments in electroculture for many years.

Financial Section

New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares

New Companies Registered

M.R.L., Ltd.—Private company. Registered June 17th. Capital, £2,000 in £1 shares. Objects: To carry on the business of mechanical, electrical, radio, &c., engineers, fine stampers, metal turners, &c. The directors are: P. J. Goodschild, 121, Bourne Hill, Palmers Green, N.13 (incorporated accountant) and J. F. Croasdell, The Brambles, Plumstead Common, S.E.18 (consulting engineer). Solicitors: Heald, Johnson & Co., 129, Wardour Street, W.1.

M. A. Mason & Co., Ltd.—Private company. Registered June 17th. Capital, £500 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in electrical apparatus, wireless instruments and apparatus, &c. The directors are: M. A. Mason (chairman), 30, Station Road, Belmont, Surrey, and P. H. Sheath (managing director), Beachy House, Fir Tree Road, Banstead, Surrey. Solicitors: Harrington, Edwards & Cobban, 33, Southampton Street, Strand, W.C.2.

W. B. & H. C. Cables, Ltd.—Private company. Registered June 18th. Capital, £1,000 in £1 shares. Objects: To carry on the business of electrical, wireless and mechanical engineers, contractors and merchants, dealers in electrical fittings, machinery and lamps, cable and other accessories, &c. The directors are: R. Woodhead, 136, Burton Stone Lane, York, and Lucy Woodhead, Bank View, Main Road, Hathersage, Derby. Solicitors: Marsh & Son, 8, Westgate, Rotherham.

Invicta Vacuum Cleaners, Ltd.—Private company. Registered June 15th. Capital, £100 in £1 shares. Objects: To carry on the business of manufacturers of, agents for, and dealers in vacuum cleaners, electrical goods, domestic machinery, &c. The directors are: E. H. Charsley (permanent chairman and managing director), Bridge House, Bexley, Kent, and C. Schmidt, Cannstadt, Dennerstrasse, Germany. Registered office: The Mill, Bexley, Kent.

Joncolux, Ltd.—Private company. Registered June 19th. Capital, £100 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in all lighting devices, electrical and mechanical engineers, machinists, &c. The permanent directors are: E. K. R. Fritschi and Mrs. J. Fritschi, both of 14, Heathcote Street, W.C.1. Secretary: E. K. R. Fritschi. Registered office: 48, Canterbury Road, Harrow.

Apex Radio, Ltd.—Private company. Registered June 17th. Capital, £500 in £1 shares. Objects: To carry on the business of radio engineers, gramophone manufacturers, dealers in electrical fittings, &c. The directors are: C. H. Bennett, 17, Ranelagh Gardens, Ilford, and F. E. Franks, 145, Trinity Road, Tooting, S.W.17. Registered office: York Avenue, Browning Street, S.E.17.

Broadcaster Radio Supplies, Ltd.—Private company. Registered June 11th. Capital, £100 in £1 shares. Objects: To carry on the business of manufacturers, importers and exporters of and dealers in all kinds of radio and electrical apparatus and accessories, gramophones and musical instruments of all kinds, &c. The permanent directors are: M. Margolin, 58, Salford Road, Streatham, S.W. (director of Erimus Furnishing Co., Ltd.), and A. Margolin, 37, Burbage Road, Herne Hill, S.E. Secretary: A. Margolin. Registered office: 22, Basinghall Street, E.C.2.

Returns of Electrical Companies

Veritys, Ltd.—Issue on June 10th, of £400 debentures, part of a series already registered.

Satisfaction to the extent of £400 on June 10th, of second debentures authorised by resolution dated April 13th, 1931, and registered April 28th, 1931. (According to the register of mortgages, the second debentures registered April 28th, 1931, originally secured £60,000.)

Amazon Telegraph Co., Ltd.—Satisfaction in full on April 13th, 1931, of trust deed dated December 7th, 1909, and registered December 11th, 1909, securing £300,000 debentures.

Power Centre Co., Ltd.—Debenture dated June 6th, to secure £1,267, charged on the company's undertaking and property, present and future, including unpaid capital. Holders: F. B. Hellon & Co., Ltd., 57, Moorfields, Liverpool.

J. W. Scott & Co., Ltd.—Debenture dated June 5th, 1931, to secure £500, charged on the company's undertaking and property, present and future, including uncalled capital. Holder: W. J. Steele, 21, Oak Road, Woolston, Southampton.

Forest City Electric Co., Ltd.—Capital, £5,000 in £1 shares. Return dated February 19th, 1931. All shares taken up. £2,210 paid, £2,790 considered as paid. Mortgages and charges, nil.

Singapore Traction Co., Ltd.—Capital, £400,000 in 200,000 preference, 199,999 ordinary, and one management share of £1 each. Return dated February 18th, 1931. 200,000 preference, 165,208 ordinary, and one management share taken up. £7 paid, £365,202 considered as paid. Mortgages and charges: £186,775.

Morley Electrical Engineering Co., Ltd.—Capital, £5,000 in £1 shares. Return dated February 23rd, 1931. All shares taken up. £3,980 paid, £1,020 considered as paid. Mortgages and charges: £1,174.

Metallic Seamless Tube Co., Ltd.—Capital, £65,333 in 20,000 preference shares of 13s. 4d. and 260,000 ordinary shares of 4s. each. Return dated February 13th, 1931. 15,245 preference and 260,000 ordinary shares taken up. £36,163 paid on 15,245 preference and 130,000 ordinary shares, £26,000 considered as paid on 130,000 ordinary shares. Mortgages and charges, nil.

Electrical Power Fitting Co., Ltd.—Capital, £500 in £1 shares. Return dated April 6th, 1931. 305 shares taken up. £218 paid, leaving £87 in arrears. Mortgages and charges, nil.

Power and Traction Finance Co., Ltd.—Capital, £250,000 in £1 shares. Return dated February 13th, 1931. 6,002 shares take up. £6,002 paid. Mortgages and charges, nil.

Evered & Co., Ltd.—Capital, £50,000 in £1 shares. Return dated February 21st, 1931. All shares taken up. £6,393 paid, £43,607 considered as paid. Mortgages and charges: £37,228.

Radio House, Ltd.—Capital, £1,000 in £1 shares. Return dated October 21st, 1930 (filed May 2nd, 1931). 1,000 shares taken up. £1,000 paid. Mortgages and charges, nil.

D.A.R., Ltd.—Capital, £100 in 1s. shares. Return dated December 31st, 1930 (filed March 2nd, 1931). All shares taken up. £75 2s. paid. £24 18s. considered as paid. Mortgages and charges, nil.

Camille Espir, Ltd.—Capital, £2,000 in £1 shares. Return dated December 31st, 1930 (filed February 28th, 1931). 734 shares taken up. £570 paid. £164 considered as paid. Mortgages and charges, nil.

Dynamic Electrical Co., Ltd.—Capital, £100,000 in 1s. shares. Return dated December 31st, 1930 (filed February 23rd, 1931). 1,500,140 shares taken up. £75,007 paid. Mortgages and charges, nil.

Electro-Mechanical Brake Co., Ltd.—Capital, £30,000 in 2,500 preference and 27,500 ordinary shares of £1. Return dated January 5th, 1931. 1,500 preference and 26,500 ordinary shares taken up. £21,965 paid on 1,500 preference and 20,465 ordinary shares. £6,035 considered as paid on the remainder. Mortgages and charges outstanding: Mortgage to Midland Bank, Ltd., issued April, 1929.

Gas & Electricity Development Co., Ltd.—Capital, £2,000 in 1,000 preference shares of £1 and 20,000 ordinary shares of 1s. each. Return dated December 31st, 1930 (filed February 11th, 1931). All shares taken up. £2,000 paid. Mortgages and charges, nil.

Wombwell Electrical Contracting Co., Ltd.—Capital, £500 in £1 shares. Return dated December 31st, 1930 (filed May 12th, 1931). 462 shares taken up. £462 paid. Mortgages and charges, nil.

East Sussex Wiring Co., Ltd.—Capital, £3,000 in £1 shares. Return dated February 24th, 1931. 2,450 shares taken up. £2,450 paid. Mortgages and charges, nil.

Mobilectric, Ltd.—J. Kirkman, accountant, of 2, Central Road, Leeds, was appointed receiver and manager on June 5th, under powers contained in debentures dated January 26th, 1931.

Radiograph, Ltd.—E. H. Francis, of 50, Suffolk Street, Birmingham, ceased to act as receiver and manager on May 30th, 1931.

British Automatic Refrigerators, Ltd.—Particulars filed of debentures for sums not exceeding in the aggregate at any one time £30,000 and premium of 5 per cent. authorised May 27th, 1931, charged on the company's undertaking and property, present and future, including uncalled capital, the amount of the present issue being £10,000.

City Notes

Callender's Cable & Construction Co., Ltd.

The accounts of this company were abstracted in our issue of June 12th, p. 1009, and the annual meeting was held on June 17th, Sir Fortescue Flannery (chairman) presiding. In presenting the report and accounts the chairman said that they had secured a continuance of excellent orders for service mains, for household cables, and for wires for internal electrical connections. This branch of the business had done even better than they expected and still continued as a flourishing and important branch of their trade. They were constantly making improvements to effect still further economies. A new item in the balance sheet, namely, a special provision for renewals and contingency account, had arisen because of the pioneer work of the company in developing cable manufacture for conveying electricity at a higher pressure than had in previous years been considered possible. This new development involved not only laboratory investigation and research, but experimental practice in the workshop. Important pioneering work in the cable industry was now taking place. Ever-increasing service was demanded from underground mains, which meant new designs and costly experiments. They were acting in close co-operation with other members of Cable Research, and the exchange of experience and knowledge was proving of the greatest value. The fall in prices of all the materials used in the manufacture of electric cables had affected the profits unfavourably. They had done a very large trade in cables for new buildings. The Anchor Works had been of enormous advantage for this section of their trade and they had been kept well and profitably occupied during the year. Their foreign connection had not diminished, but the number of orders during the latter part of 1930 was undoubtedly affected by the international depression in trade. The cable work for the South-Eastern grid was entrusted to them, and every effort had been made by designing the standards which carry the cables so as to be as unobtrusive as possible. Owing to the difficulty in securing wayleaves, &c., only a small portion of the work had been completed. The experience gained by the Central Board and by themselves and other contractors was now tending to eliminate such delays and waste of money, and the work

was now progressing much more smoothly than it did in the early stages. Their subsidiary company in New Jersey (U.S.A.), whilst suffering from the depression of trade in the United States, was still able to hold its own. The subsidiary companies in which they possessed a large interest, together with their shareholdings in various electric supply undertakings, continued to be satisfactory. They had disposed of their Surbiton undertaking and agreed the amount to be paid for their interests in South Wales, and both transactions showed considerable profit. The directorate had been increased since the last general meeting, Mr. Theodor Petersen having been advanced to the position of assistant managing director, and Mr. Thomas Ormiston Callender, the son of their managing director, having been appointed an advisory director. Reviewing the state of trade throughout the world the chairman said that Great Britain had lagged behind other countries in her use of electricity for power and lighting, but this indicated considerable future demand for the employment of all electrical manufacturing companies. If the railways were to hold their own they must electrify to a large extent and indeed some of them had already begun. They need not therefore look with pessimism to the future, but might reasonably hope that with the general revival of trade, cable-making generally and their company in particular, would not be the last to participate.

Sir T. O. Callender (deputy chairman and managing director), in seconding the resolution for the adoption of the report and accounts, said that in the early part of the year they had a considerable amount of work in hand, but concurrently with the break in prices which occurred in the copper market, there was a shrinkage of orders. He saw glimpses of better times, and the fact that during the last two weeks there had been a number of orders from colliery proprietors was the first sign of "Springtime." Among the new developments to which they had given special attention was the electrification of railways. The amount of work done in Great Britain was insignificant compared with what would have to be done later, and he had no doubt they would get their share of the work when it came. They had supplied the work for the electrification of the Manchester-Altrincham line. Recently they had opened a new department under the charge of his son, Mr. T. O. Callender, to deal with ship work, and in the last few days had received orders for the cabling on board the giant Cunarder. A considerable part of the cabling work on the *Empress of Britain* had also been carried out by them. Despite disturbances in India and China they had carried out considerable business, while in the Punjab they had received important contracts for the overhead grid connecting a number of cities. In the Sudan they were now at work equipping the town of Wad Medani. An important contract for the Central Argentine Railway in connection with the electrification of the Buenos Aires suburban lines had just been completed, and elsewhere in South America they were still sending reasonably satisfactory shipments. Difficulty had been experienced in obtaining contracts in South Africa, through trade depression, but reports they had received indicated that things were improving. Important orders had been received in connection with the extension of the electrical system in Athens.

The report and accounts were adopted.

General Electric Co., Ltd.

The accounts for the year ended March 31st last show a profit of £1,122,007, as compared with £1,179,007 in the preceding year. To this a balance brought forward of £379,165 is added, making £1,501,173. After meeting debenture interest, depreciation, preference dividends, &c., and transferring £132,923 (130,000 to reserve, there is a balance of £626,244. As announced in our last issue, the ordinary dividend is maintained at 10 per cent., but there is no bonus (against a bonus of 4 per cent. last year); the balance carried forward is £400,880. The report states that the company's works generally have been well employed. Output and orders received have been maintained at a satisfactory level, though the demand in the industrial market has been restricted. Economic and political difficulties in overseas markets have adversely affected both the volume of export business and the trading of the overseas branches. Investments in subsidiary and associated companies show an increase of £569,000. This increase is mainly due to a considerable expansion of the company's interests in the electricity supply business. Undertakings have been acquired at Shoreham-on-Sea, in South-East Yorkshire, in South-West Wales, and elsewhere. The company's position in the lift industry has been strengthened by providing additional capital to its subsidiary, the Express Lift Co., Ltd., to finance the purchase of a majority interest in Smith, Major & Stevens, Ltd. In Australia, a financial interest has been taken in two manufacturing concerns. During the year an issue of £3,500,000 five per cent. debenture stock, mainly to provide funds for the redemption of the 7 per cent. debenture stock, met with marked success. Of the 7 per cent. debenture stock, only £880,240 remains unconverted; this will be redeemed on September 30th next. The directors have transferred from reserve account the sum of £202,923 to write off the expenses of the debenture stock issue. The reserve will then stand at £1,290,000. The number of the company's employés at March 31st last was 24,166, a decrease of some 700 as compared with the preceding year. With the report, the company has circularised shareholders with an illustrated brochure of its products and some of the installations it has carried out, to inform them of the continued progress of the company. Meeting: June 30th.

Madras Electric Supply Corporation, Ltd.

The annual meeting was held on June 16th, Mr. J. G. Stone (chairman) presiding, and in presenting the report and accounts (ELEC. REV., June 19th, p. 1069), the chairman said the progress made during recent years had been maintained during 1930. The increase in electricity sold was 5.9 per cent. in excess of 1929, while the average rate obtained per kWh sold was As.2.40, against As.2.47. The demand from the outlying districts of Mambalam and Sembiam was increasing satisfactorily. The Government having sanctioned an extension of their licence to Saidapet, negotiations were now proceeding for sites for the necessary combined switching and sub-station, and for the pole-type transformer stations. A preliminary supply of electricity was now being made to the South Indian Railway Co., and it was expected that, before the end of the year, the contract with them for a full supply of electricity to operate the railways' lines in and around the city would be in full operation. The expenditure of £11,523 on machinery included the erection of the second 60,000-lb. boiler, a 5,000-V switchboard, and the equipment of various sub-stations, and the amount spent on mains (£15,974) included h.p. cables to Mambalam and to the South Indian Railway sub-station, besides the usual extensions. In order to keep pace with the growth of the business, further capital would be required, and they would be communicating with the shareholders with regard to this towards the end of the year. There was an improvement during 1930 in the working of the tramway, in which company they held the whole of the ordinary share capital. After providing for debenture interest, &c., there was a balance (including the amount brought forward) of £14,395. The ordinary dividend was 2½ per cent., leaving £6,520 to be carried forward. Steps were being taken to improve the tramway company's rolling stock. The report and accounts were adopted.

Delhi Electric Supply & Traction Co., Ltd.

The accounts for 1930 show a revenue of Rs. 11,63,367 from the sales of electricity, and a revenue of Rs. 3,25,759 from passengers carried. After adding interest, &c., to the net revenue, and deducting administration charges in London and Delhi, and loss on exchange, there remains £39,760, to which is added £19,600 brought forward, making £59,360 available. From this provision is made for depreciation and renewals reserve, British and Indian taxation, and staff benefit. A final dividend of 8 per cent. is to be paid, making 12 per cent. for the year, leaving £21,860 to be carried forward. The report states that the company has not obtained the new and extended licence applied for in 1929. Arrangements for an increased bulk supply of electricity from the Government power station at New Delhi are approaching completion.

The annual meeting was held on June 16th, when Mr. K. A. Scott-Moncrieff (chairman), who presided, in the course of his speech, said that despite bad trade and unstable conditions, their staff at Delhi had succeeded in adding 929 new consumers, making the total connected 10,996, with a load of 13,902 kW. The sales of electricity totalled 5,944,747 kWh. Reductions had been made in the charges for electricity, but the anticipated increase in business had been somewhat disappointing. Various hartals had interfered with trade, shops had been closed, and lighting and power supplies had been consequently reduced. These hartals were also responsible for a marked decrease in passengers carried and in the resultant revenue. They were unable to arrive at a long-term contract for a bulk supply for all their requirements from the Government power station at New Delhi, but they had succeeded in obtaining the approval of the local administration to a revision of the contract, which would give them a considerably greater quantity of electricity in bulk. Meantime they had brought into use a new 780-kW generating plant recently acquired. The report and accounts were adopted.

Brazilian Traction Light & Power Co.

The accounts for 1930 show a net revenue of $16,025,339 (Canadian currency), as compared with $16,861,096 in the preceding year. The preference dividends absorbed $24,315 and the three quarterly payments on the ordinary shares of 50 cents each, $9,507,021, while the stock dividend of 2 per cent. required $2,544,521, leaving a balance of $3,949,482. The special stock dividend of 1 per cent. on the ordinary shares, announced in December, 1929, was paid in March, 1930, and the ordinary shares representing this stock dividend were taken into capital stock account at $25 per share, amounting to $1,573,821, and this amount has been applied against the balance brought in from 1929. The surplus to be carried forward, with the $3,949,482 now added, amounts to $13,682,553.

Cork Electric Supply Co., Ltd.

In a letter to the shareholders, the directors state that now that the Supreme Court in Dublin has decided that all shareholders, both preference and ordinary, are entitled to share rateably in the surplus assets, upon the winding up of the company, and now that all arrangements in connection with the cessation of the tramway undertaking have been satisfactorily concluded, they are of opinion that there is now no reason why the company should not be wound up, the share capital repaid, and the surplus assets distributed rateably among the shareholders. They accordingly give notice that meetings will be held on June 29th and July 1st in order to

pass and confirm the necessary resolutions for the winding up of the company. The sale of the lighting undertaking to the Electricity Supply Board for the sum of £496,500 resulted in a surplus to the company of over £146,000. It is suggested that compensation amounting to £18,700 shall be paid to the directors and certain officials of the company. After providing for this compensation, the liquidator's remuneration, and the costs of winding up and repaying the whole of the share capital, both preference and ordinary, it is estimated that there will be a surplus of 10s. per share for distribution rateably amongst the preference and ordinary shareholders, making a total return of 30s. per £1 share.

British Electric Traction Co., Ltd.

In the course of his speech at the annual meeting on June 23rd, Mr. J. S. Austen (chairman) said that one of the most important events during the past year was the purchase of the share capital of the National Electric Construction Co. They had also taken a one-half interest in six small gas companies in Scotland. It was his ambition to get back for the shareholders the £1,000,000 which they lost when the capital was written down. The board therefore proposed to create £1,000,000 debenture stock and then to give £500 of that stock to every holder of £100 of deferred stock. Should the scheme be carried a holder of £100 of deferred stock would receive £15 a year interest on his £500 of debenture stock. It was proposed to discontinue the payment of the 5 per cent. cash dividend on the deferred stock, so that the increase would be only 10 per cent. It was also proposed to reduce the annual stock bonus on the deferred stock from 10 per cent. to 5 per cent. The redemption of the debenture stock would be by tender only, and nothing would be paid on this debenture stock until the preference and the preferred ordinary had received all their dividends in full. The scheme would be placed before the shareholders in the autumn. As to the current year, they knew that the income from some of their investments must be less than last year. Whether increases in other directions would make up for it, they did not know, but, anyhow, the balance of loss, if any, could not be sufficient seriously to affect the position. The report and accounts were adopted.

The report of the *Mexican Light and Power Co., Ltd.*, for 1930 shows a revenue of $4,777,746, as compared with $4,849,770 in 1929. Administration and general expenses absorbed $139,296, interest on bonds $2,618,751, and $854,086 was transferred to sinking funds, leaving a balance of $1,165,612. This has been applied in the payment of the dividends on the 7 per cent. and 4 per cent. second preference shares, leaving a surplus to be carried forward, including the amount brought in, of $2,532,962. The report records the resignation from the board, owing to the pressure of personal business, of Mr. G. T. Clarkson.

The accounts of the *Mexican Tramways Co.* for 1930 show gross earnings of $9,943,739 (Mexican currency), as compared with $10,724,938 for 1929. After providing for depreciation reserve, there is a net loss of $672,307, as against a net operating profit of $225,093. In his report the president states that the competition of the independent omnibus services is still one of the most important issues the company has to face. The number of 'buses in direct competition with the company's lines shows an increase of 4.87 per cent. as compared with 1929.

The accounts of the *South Wales Power Co., Ltd.*, for 1930 show a credit balance of £22,251, which it is proposed to carry forward. The report states that the provisional agreement for the sale of the assets of the company, namely, the holdings in the South Wales Electrical Power Distribution Co., to the Shropshire, Worcestershire and Staffordshire Electric Power Co., approved by the shareholders, provides that the purchase money shall be paid in three instalments. The participation in the revenue of the Distribution Company ceased on January 1st last.

The profit of *Greenwood and Batley, Ltd.*, for the year ended March 31st last amounted to £17,320, as against £32,851 in the previous year. To this is added £13,801 brought forward, and £8,500 transferred from provision for contingencies, making a total of £39,621. From this £6,000 is allocated to depreciation, and it is proposed to pay a final ordinary dividend of 2½ per cent., making 5 per cent. for the year (same), leaving £9,174 to be carried forward.

Last week the *South Metropolitan Electric Light & Power Co., Ltd.*, published, for information only, particulars of an issue of £500,000 of 4½ per cent. debenture stock at 93 per cent., the whole of which is being purchased by Messrs. W Greenwell & Co. The stock is redeemable at par in 1972, or at six months' notice after January 1st, 1955.

The report of the *International Hydro-Electric System* and its subsidiaries for the first quarter of this year shows a total gross revenue of $12,999,275 (against $12,938,561) and a net revenue of $7,544,880 (against $7,431,009). After providing for depreciation, interest, and dividends, $729,336 (against $1,107,077) is added to surplus.

A net profit of £255,481 is shown in the accounts of the *Globe Telegraph & Trust Co., Ltd.*, and after adding £17,460 brought in and £28,000 transferred from general reserve, there is a balance available of £300,941. As announced in our last issue, the final ordinary dividend is 3s. 6d. per share, making a total payment of 8½ per cent. for the year (against 10 per cent.), leaving £16,633 to be carried forward. Meeting: June 29th.

The report of *Edgar Allen & Co., Ltd.*, for 1930-31 shows a net loss of £34,776, as compared with a profit of £23,491 for the previous year. A credit balance of £7,678 is brought forward, and £10,000 is transferred from general reserve. The preference dividend is met, and the debit carried forward is £32,097. The report states that the depression in the steel and engineering industries adversely affected the business of the company.

The accounts of *James Keith & Blackman Co., Ltd.*, for the year ended March 31st last show a net profit of £22,373. It is proposed to pay a dividend on the ordinary shares of 10 per cent., less tax, against 17½ per cent. in the previous year, leaving £18,575 to be carried forward (against £16,244).

The report of *Berry's Electric* (1928), *Ltd.*, for the year ended March 31st last shows a trading profit of £24,730 (as against £23,090 in the preceding year), to which is added £305 brought forward, making £25,035. After deducting income tax, interest on 7½ per cent. (20-year) notes, &c., it is proposed to pay a dividend of 2½ per cent., tax free, and to carry forward £1,787.

The accounts of *Chadburn's (Ship) Telegraph Co., Ltd.*, for the year ended March 31st last shows a gross profit of £19,618, and a net profit of £4,673, to which is added £3,802 brought forward, making £8,475. It is proposed to pay dividends of 6 per cent., less tax, on the preference shares for the year ended March 31st, 1929, and 3 per cent., less tax, for the half year ended September 30th, 1929. £4,200 is to be carried forward.

The directors of *W. T. Henley's Telegraph Works Co., Ltd.*, have recommended, subject to audit, a final dividend on the ordinary shares of 2s. 6d. per share, less tax, making 4s. per share for the year. They also recommend a cash bonus of 2s. per share, less tax. The total is the same as for 1929-30.

The *Victoria Falls & Transvaal Power Co., Ltd.*, has announced a final dividend of 12 per cent., less tax, on the ordinary shares, making 15 per cent. for the year (same).

The directors of the *St. James' and Pall Mall Electric Light Co., Ltd.*, have announced an interim dividend of 3¾ per cent. on the ordinary shares (same).

Stocks and Shares

TUESDAY EVENING.

THE proposal of President Hoover that there should be a moratorium applied to war debts for the space of a year had an electrical effect upon markets in the Stock Exchange. American issues went up by points, the bear brigade hastening to scramble into stocks of which they had been short for, it may be, months past. Cables & Wireless stocks were particularly good. The plan is welcomed as an indication of a shifting of the American point of view, that the questions of reparations and war debt, whatever President Hoover may say to the contrary, are closely interwoven, and that, one of these days, the much more important step may be taken of cancelling the latter.

Gilt-Edged Stocks

The stocks and shares with which we deal have felt the strengthening influence which the American proposals infused into confidence and hopefulness. No little discussion has arisen as to what will be the ultimate effect upon gilt-edged stocks if the nations agree to accept President Hoover's proposals. Revival in trade is considered likely to bring about a fall in the values of the purely gilt-edged stocks into which, for some time past, there has been no other channel for diversion of money that demanded safety first. It is argued that British Government stocks stand at an artificial level of value, one which is likely to be lowered if trade revives and requires capital which would have to be drawn from the sale of gilt-edged securities. The 4½ per cent. debenture stocks of the Central Electricity Board and the London & Home Counties J.E.A. are, however, higher on the week, and these make a very fair standard by which the position, as it concerns the gilt-edged stocks, can be gauged. There is a continuous demand for first-rate stocks of any kind. Lancashire Electric 5 per cent. debenture stock, for a block of which the company recently obtained 97½, is to-day quoted at 101½. South Metropolitan Electric 4½ per cent. debenture, reference to whose coming was made here last week, is now obtainable on the basis of 96½. For this stock the company has received 98, less ½ per cent. commission.

New Issues of Stock

Some of the proprietors of these companies are asking why they were not given the opportunity for subscribing to the new stocks rather than outsiders. The South Metropolitan Company is paying off its present 4½ per cent. debenture stock on July 1st, and some, at least, of the shareholders would have been glad to replace their investment with the new issue. The question is raised as to whether companies, when they have an issue of stock which they intend to place privately, invite tenders in order to obtain the best price under competition, or whether the stock is placed by mutual agreement. In days such as these, when appetite for investment securities is very keen, first-class stocks such as those above-mentioned are in such request that companies should be able to make a very

good bargain for their shareholders. The fact that the companies receive a price which sometimes is a couple of points under that at which dealings start when the purchasers care to place it on the market, has aroused attention, and directors will do their shareholders a service if they explain the procedure employed in such circumstances.

Home Railway Stocks

Underground Electric Railway ordinary shares rose 6d. to 21s. 6d. in consequence of bear purchasing on Mr. Hoover's moratorium proposals. The company's 6 per cent. income debenture stock is marked down 4 to 102¼.

At the British Electric Traction meeting, held on the Tuesday in this week, the chairman announced the creation of a new 3 per cent. deferred debenture stock. Dividends on the deferred stock are to be paid in this new security, which will be redeemable by tender. The price of B.E.T. deferred is unchanged at 1025. Metropolitans and Districts were both called higher, but the quotable prices were left unchanged. In the London Transport group, no changes occurred, London United Tramways debenture remaining at 62¼, and London & Suburban Traction preference at 11s. 6d.

Electricity Supply Shares

Decided strength marks the list of Home Electricity Supply shares, the provincial group providing the principal improvements. There are rises in Scottish Power, Midland Counties Electric, and Midland Electric Power. Clyde Valleys and Bournemouth & Poole shares are both better than the official prices indicate. Isle of Wight 4½ per cent. debenture, at 93½, is 2 points higher. On the other hand, Cornwall 7 per cent. preference, at 20s. 6d., are slightly easier. Atlas ordinary strengthened to 17s. 6d. The preference are unchanged at 24s. 6d.

Manufacturing Issues

G.E.C. ordinary, the dividend on which, as announced here last week, makes 10 per cent. for the year, comparing with 14 per cent. for the previous twelve months, are 3s. 6d. up, at £2. At various times, occasion has been found to deprecate the idea that the company would continue to pay the 4 per cent. bonus in addition to the 10 per cent. dividend that was declared for 1929. The current dividend is considered quite satisfactory. Shares in most companies connected with manufacturing and equipment are decidedly good. Enfields, at 3¼, are ¼ up. British Insulated have risen ½ to 2¾, Callender's 6s. 3d. to the same price, and Henley's 10s. to 5¾. The last-named company has declared its usual dividend, making 30 per cent. for the year. This is up to the best expectations. Some opinion had looked for the Henley dividend to be reduced to 25 per cent., and there would have been no surprise had the board decided upon the latter rate. Henley's, however, stand in the same sort of position as the other sound manufacturing companies, their financial situation being extremely strong, enabling them to maintain the dividend. Siemens improved to 22s. 6d., Johnson & Phillips to 28s. 9d., and the list as a whole shows pronounced improvement. It cannot be said that the rises are due to any particular rush of buying orders. The advances have occurred more in sympathy than for any other reason. The market shortage of shares, to which reference has been made so often in these columns, has a vivid effect when a market takes a turn for the better. In the hope that the prices of commodities and metals would follow those of stocks and shares, as a result of President Hoover's proposals, rubber shares were marked up to a modest extent. It became as difficult to buy anything as, beforehand, stocks and shares were hard to sell. Babcock and Wilcox, after being 42s. 6d., rallied to 45s. Vickers are a trifle better at 6s. 9d.

Cables and Wireless

The stock which had the biggest rise throughout the markets in the excitement of Monday morning was Cables & Wireless 5½ per cent. preference. The price on Friday night had closed at 52, and, on the moratorium suggestion of President Hoover, and in a scene of violent excitement in the Stock Exchange, the stock was rushed up to 61½. At that figure a good deal came in, and part of the rise was lost, but on the week there is a substantial recovery left at 57½. Both classes of ordinary stocks are also better. The boomlet is attributed mainly to bear covering, rather than to any great rush to buy the stocks on the part of the investor. The May traffic return is a poor one, but any improvement in trade would immediately be reflected in the Cables & Wireless earnings. With these rises, Globe Telegraph & Trust ordinary and preference have both sympathised, the shares being 30s. and 15s. higher, respectively. American Telephone & Telegraph stock, at 182½, is 8½ points up. International Telephone & Telegraph, at 35, has risen 6. Western Union Telegraph common shares, at 120, show a gain of 10 points.

Dollar Stocks

Brazilian Traction led a substantial recovery in American issues. The price on Friday was 15½, from which it recovered to 18¾, on Monday morning, and held this gain: The preferred shares rose 10 to 90. Brazilians were good as a rule. Rio Tramway first mortgage bonds, at 81½, show a gain of a point. The second bonds, at 77, are 3 points higher. Shawinigan Water moved up to 42½, Montreal Light & Power to 46½, and Power Corporation of Canada to 46.

Share List of Electrical Companies

Home Electricity Companies

	Nom.	Approx. Dividend 1929.	1930.	Price June 23 1931.	Rise or fall.	Yield p.c.
	£					
Bournemouth and Poole	1	15	15	58/9	—	5 2 2
Brompton Ordinary	1	8½	8½	28/6	—	4 18 3
Central Electricity 4½% Deb. ...	Stock	—	4½	99	+1½	4 11 0
Charing Cross Ordinary	1	8½	8½	30/-	—	4 18 4
Chelsea	1	8⅞	8⅞	27/6	—	5 1 10
City of London	1	10	10	36/3	—	5 10 3
Clyde Valley	1	8	8	32/-	—	5 0 0
County of London	1	7	10	45/-	—	4 9 0
Edmundsons' 7% Pref.	1	7	7	25/6	—	5 9 10
Elec. Supply Corporation	1	11	11	42/6	—	5 3 9
Kensington Ordinary	1	8	8	30/-	—	4 13 4
Lancs. Light and Power	1	7	6½	20/9	—3d.	6 5 4
London & Home Counties 4½% Deb.	Stock	—	—	99	+1	4 11 0
London Electric	1	8½	9	34/-	—	5 5 11
Metropolitan	1	9	10	39/3	—	5 1 11
Midland Counties	1	6½	7	27/6	+⅛	5 1 10
Mid. Elec. Power	1	15	8	27/6	+6d.	5 16 6
Newcastle-on-Tyne Ordinary ...	1	6	6	21/3	—	5 13 0
do. 7% Pref.	1	7	7	27/-	—	5 3 8
Notting Hill 6% Pref.	10	6	6	11½	—	5 6 8
North Met. Elec. 6% Pref.... ...	1	6	6	24/-	—	5 0 0
St. James' and Pall Mall	1	8	8	29/-	—	4 16 7
Scottish Power	1	8	8	28/9	+⅛	5 11 5
South London	1	8½	8½	27/6	—	5 1 10
Urban Ordinary	1	7	7	27/6xd	—	5 1 10
Westminster Ordinary	1	9½	8½	29/-	—	4 16 7
Whitehall Elec. Invst. 7½% Pref....	1	7½	7½	24/6	—	6 2 5
Yorkshire Elec.	1	8	8	30/-	—	5 6 8

Home Rails

Central London Ord. Assented ...	Stock	4	4	76	—	5 5 3
Metropolitan	,,	4	3½	48½	—	7 4 4
do. District	,,	5	5	64½	—	7 15 0
Underground Electric	£1	8	8	21/6	+6d.	7 8 10

Telegraphs and Telephones

Anglo-Am. Tel. Pref....	Stock	6	6	104½	—	5 14 10
do. Def-	,,	1½	1½	25	—	6 0 0
Automatic Telephone	1	12½	12½	32/6	—	7 13 10
Cables & Wireless 5½% Pref. ...	Stock	5½	5½	57½	+3	9 11 4
do. A 7½% Ord.	,,	Nil	—	16	+2	... ...
do. B Ord.	,,	Nil	—	10	+2	... ...
Globe Tel. and T. Ord.	10	10	8½	9	+1½	*9 8 10
do. do. Pref.	10	6	6	9½	+⅜	6 9 9
Great Northern Tel.	10	20	20	25½	—	7 17 0
Marconi-Marine	1	15	15	33/9	+⅛	8 18 0
Oriental Telephone Ord.	1	12	12	2½	—	*5 6 8

Home and Foreign Trams, &c.

Anglo-Arg. Trams First Pref. ...	5	5½	—	12/6	—	... ...
do. do. 2nd Pref. ...	5	6	—	7/6	—	... ...
do. do. 5% Deb. ...	Stock	5	5	21½	—	23 5 0
British Electric Traction Def. Ord.	,,	5	5	102⅝	—	... ...
do. do. Pref. Ord. ...	,,	8	8	122½	—	6 10 8
Brazil Traction	100	8	—	18¾	+2¾	... ...
Brit. Columbia Elec. Rly. Pcc. ...	Stock	5	5	97½	—	5 2 7
London & Sub. Trac. 5% Pref. ...	1	Nil	Nil	11/6	—	... ...
London United Tram Deb. ...	Stock	4	4	69½	—	6 8 0
Mexico Trams, 5% Bonds	—	5	5	43½	—	11 15 4
Mexican Light Common	100	Nil	Nil	33½	—5	... ...
do. 7% Pref.	100	7	7	64½	—	10 17 0
do. 1st Bonds	—	5	5	74	—2	6 11 7
Victoria Falls Ord.	1	15	15	57/6	—	5 4 2
Yorkshire (West Riding)		Nil	Nil	5/6	—	... ...

Manufacturing Companies

Assoc. Elec. Ord.	1	6	6	19/6	+1/-	6 3 1
do. Pref.	1	8	8	27/6	—	5 16 0
Babcock & Wilcox	1	15	14	4½/-	—	*6 4 5
British Aluminium Ord.	1	10	10	25/-	—	8 0 0
British Insulated Ord.	1	15	15	2¾	+⅛	5 9 1
Brush Ord.	Stock	10	5	60xd	—	8 5 0
Callenders	1	15	15	2¾	+⅛	5 9 1
do. 6½% Pref....	1	6½	6½	25/-	—	5 4 0
Crompton Parkinson Ord.	5/-	30	30	9	—	8 11 5
do. 8% Pref.	1	8	8	28/-	—	5 14 5
Edison-Swan 1st Pref.	1	7½	7½	23/9	—	6 6 4
do. 5% Deb.	Stock	5	5	94½	—	5 5 10
Electric Construction	1	5	Nil	11/3	—	... ...
Enfield Cable Ord.	1	25	25	3¾	+⅛	6 8 10
English Electric	1	Nil	Nil	5/-	—	... ...
do. do. Pref.	1	Nil	Nil	5/-	—	... ...
Ferranti Pref.	1	7	7	31/-	—	6 10 4
G.E.C. Pref.	1	6½	6½	26/-xd	—	5 0 0
do. Ord.	1	14	10	2	+3/6	7 18 6
Henley	1	30	30	5¾	+⅛	5 11 6
do. 4½% Pref.	5	4½	4½	4¾	—	5 2 10
India-Rubber	1	Nil	Nil	4/6	—	... ...
Johnson & Phillips	1	10	10	28/9	+⅛	6 19 2
Siemens Ord.	1	7½	7½	22/6	+6d.	6 13 4
Telegraph Construction	12	10	7½	12½	—⅜	7 3 10

*Dividends paid free of Income Tax.

Our Foreign Electrical Trade

Electrical Exports and Imports during May

DURING May, according to the Board of Trade returns, both imports into and exports from this country showed substantial declines from the May, 1930, levels. Imports were lower by 23 per cent., while exports fell to the extent of 33 per cent.

The trade in electrical goods and machinery contributed to the lower figures. Imports, at £519,575, were 26 per cent. lower than in the corresponding month of last year, but exports showed an even greater fall, the total of £941,260 representing a fall of over 40 per cent.

The level reached by the exports was the lowest for several years, mainly on account of the slump in the machinery section, which in spite of a slight rise above the April figure in the unenumerated class, showed a net fall of £56,195 as compared with April, and one of £256,162 in comparison with May, 1930. The telegraph and telephone apparatus exports were £25,048 down from the previous month's level, but over £148,000 lower than in May last year. The cable exports reached a value less than half that shown for May, 1930. The non-telegraph class declined from £270,000 to £101,000; non-submarine telegraph and telephone cables from £102,000 to £51,000; and submarine types from £77,000 to £8,000. It may be presumed that a substantial part of this decline was due to the heavy fall in the prices of materials during the past year. Not a single item in the export list showed an advance on the figures for May last year.

The fall in electrical imports, as compared with May, 1930, although considerable, was not proportionately so large as the decrease in exports; the total actually rose above the April level mainly due to the larger imports of electrical machinery. In the comparison with the corresponding month of last year two increases are observed—in arc lamps and parts, and telegraph and telephone apparatus. The latter class expanded considerably during 1928 and 1929; a decline set in again last year but these imports are still above the normal level. The principal decrease in the import list was that of £84,678 in the case of meters and instruments. This was another item which swelled to abnormal proportions for a year or so, mainly, it is believed, on account of an influx of talking film apparatus, which has now diminished. Electrical machinery imports fell considerably in value as compared with the May, 1930, figure. The decrease in volume, however, was not so great, the figure being 491 tons, against 553 tons.

Our principal table shows that during the completed portion of the year electrical exports declined by £2,532,140, or over 31 per cent., while imports fell by £1,269,079, equivalent to nearly 33 per cent.

The distribution of British electrical machinery exports is detailed in our inset table, and the comparative figures show that in every case, with but one exception, the weights and values were lower. The one exception is the rise in the volume of exports to European countries, although at the same time the value fell. The most serious decline was in the Indian trade, so far as volume was concerned, but proportionately the greatest decrease occurred in the case of Japan, a market which has dwindled practically to nothing during the past two or three years. The Australian purchases continue to fall and reached a very low level in May. It is strange that the one feature to relieve the doleful list is the maintenance of our exports to European countries—which are supposed to be the most difficult of markets for our manufacturers.

It may be of interest to mention that while the value per ton of imported electrical machinery fell from £338 to £293, the value per ton of electrical machinery exports actually increased—from £154 to £162. These contrasted figures incidentally indicate the wide difference between the character of the imports and that of the exports. In the former case the higher "unit" value manifests that the machinery is of the smaller classes, while our exports are mainly of the "heavy" type.

Electrical Machinery Exports

Destination.	Quantities			Values		
	May, '30. Tons.	May, '31. Tons.	Inc. or dec. Tons.	May, '30. £	May, '31. £	Inc. or dec. £
Europe	498	542	+ 44	109,153	102,918	− 6,235
Japan	100	1	− 99	16,054	827	−15,227
South America ...	352	175	− 177	62,384	27,021	−35,363
South Africa ...	371	171	− 200	46,881	26,232	−20,649
British India ...	763	262	− 501	121,717	47,696	−74,021
Australia	381	173	− 208	52,642	20,246	−32,396
New Zealand ...	303	102	− 201	38,608	16,104	−22,504
Canada	320	231	− 89	38,346	25,949	−12,397
Other countries ...	629	310	− 319	89,362	51,992	−37,370
Total ...	3,717	1,967	−1,750	£575,147	£318,985	−£256,162

	Exports.			Imports.			Re-Exports.		
	Electrical exports for May, 1931.	Inc. or dec. as compared with April, 1931.	Inc. or dec. as compared with May, 1930.	Electrical imports for May, 1931.	Inc. or dec. as compared with April, 1931.	Inc. or dec. as compared with May, 1930.	Electrical re-exports for May, 1931.	Inc. or dec. as compared with April, 1931.	Inc. or dec. as compared with May, 1930.
Electrical goods and apparatus (unenumerated)	£157,797	−£11,904	− £46,542	£112,646	+ £12,754	− £6,564	£6,216	+ £1,339	− £537
Insulated cables and wires ...	100,956	− 13,574	− 160,130	54,213	− 6,934	− 21,610	240	− 130	− 78
Glow lamps	25,605	− 5,307	− 38,626	20,938	+ 266	− 9,639	170	− 69	− 263
Arc lamps and parts	1,315	+ 896	− 1,117	4,807	+ 731	+ 3,350	54	− 106	− 100
Batteries and accumulators ...	56,417	+ 6,386	− 16,213	35,083	+ 3,362	− 16,143	8,342	+ 8,026	+ 8,118
Meters and instruments ...	25,064	− 4,425	− 6,268	32,674	+ 6,727	− 84,678	728	+ 369	− 2,035
Carbons	836	+ 13	− 1,445	8,651	− 6,003	− 5,993	26	− 351	− 34
Switchboards (not telegraph or telephone)	3,647	+ 1,255	− 2,174	24	− 49	− 82	1	− 8	+ 1
Electrical Machinery—									
Electrical machinery (unenumerated)	196,590	+ 2,077	− 149,634	143,669	+ 24,767	− 43,420	10,196	+ 541	− 4,173
Railway and tramway motors	503	− 19,456	− 20,027	—	—	—	—	—	—
Other motors and generators...	121,892	− 38,816	− 86,501	—	—	—	—	—	—
Telegraph and Telephone Cable and Material—									
Telegraph and telephone wires and cables (not submarine)	50,862	− 3,390	− 51,586	1,515	− 1,607	− 4,058	25	− 17	+ 25
Submarine telegraph and telephone cable	8,397	− 2,017	− 68,548	—	—	—	—	—	—
Telegraph and telephone apparatus	191,379	− 19,641	− 28,249	105,355	− 9,370	+ 4,122	18,106	+ 9,726	− 20,320
Total	£941,260	−£107,903	−£677,060	£519,575	+ £24,644	−£184,715	£44,104	+£19,320	−£19,396
Decrease for first five months of the year		Exports £2,532,140			Imports £1,269,079			Re-Exports £121,639	

Chilean Tariff Increases

The *Board of Trade Journal* gives details of the increases recently made in Chilean import duties. A number of classes of electrical equipment are affected, including electrical wires and cables, the duty on which is raised from 0.20 to 0.50 peso per kg.; lamps for lighting and heating (from 0.20 to 1.00 peso per kg.); telephone, telegraph, and radio apparatus (from 0.30 to 5.00 pesos per kg.); dynamos, convertors, transformers, &c. (formerly 0.10 peso per kg.) are now subject to a sliding scale of duties according to weight; arc lamps and projectors (from 0.30 to 1.00 peso per kg.); meters and measuring instruments (from 1.00 to 1.50 pesos per kg.); cookers, heaters, kettles, &c. (from 1.00 to 1.50 pesos per kg.); and electromedical apparatus (from 2.00 to 5.00 pesos per kg.). The duty on X-ray apparatus, &c., is reduced from 2.00 to 1.00 pesos per kg.; this appears to be the only decrease among the electrical items.

Indian Electrical Notes

(FROM OUR INDIAN CORRESPONDENT)

Cable Tariff Application

THE Indian Tariff Board has been asked by the Government of India to inquire into the question of protection for the electric cable and wire industry in India, and the inquiry will be undertaken very shortly. The application was made by the Indian Cable Co., Ltd., whose works are at Jamshedpur, with a head office in Calcutta. The company has been in existence for nearly ten years, and has manufactured wires and cables to the value of nearly Rs.15 lakhs. The bulk of the cable now used in India is imported from the United Kingdom. In the past four years, however, considerable quantities have been imported from Continental countries, mainly Germany.

Protective Tariff Demanded

The duties at present levied on imported wires and cables have been fixed at a low rate, in accordance with the Government's declared intention of admitting machinery and component parts thereof (required for industrial purposes) free of duty. As far as possible, cables and wires at present imported into India which are below the size required generally for overhead transmission and for industrial purposes, are admitted free of duty, except rubber-insulated cables, which pay a duty of 5 per cent. The contention of the Indian Cable Co. is that the admission of imported cables and wires at this low rate places the Indian product at a disadvantage. The prices that the products of the Indian company fetch are generally lower than those of the corresponding British articles, but their products meet with strong competition from Continental products.

Electricity in Farming

Investigations are being carried out on the Government Agricultural College Farm at Cawnpore to establish the comparative economics of the different forms of available power such as oil engines, steam engines, and electricity, with reference to water pumping, threshing, and fodder cutting. On this farm electrical power is available through an extension of the town supply at the rate of 2 annas, 6 pies per kWh for the first 900 kWh consumed each month, and thereafter at half that rate. It is found that this rate for all practical purposes is two and a-half times as high as that which is contemplated in the Ganges hydro-electric schemes. Even then, the results showed that electricity on the farm for threshing purposes was considerably cheaper than the petrol-paraffin engine. The same is true with regard to the cost of chopping green fodder. Although the observations cover a limited field for the utilisation of electrical energy, they indicate possibilities which are well worth careful study by people interested in modern farming methods in such parts of the country as are likely to provide cheap electrical power for the use of the agriculturist.

Government and Electricity

The Government of Madras, after long deliberation has decided the question of who should distribute the electric power generated by the various schemes now maturing in the Madras Presidency, and there is general satisfaction at the decision that the Government is undertaking the business itself. It is hoped in future to constitute an Electricity Board for the management of the hydro-electric schemes. The Board is expected to be under popular and expert control, and it is understood that legislation in this connection will soon be undertaken. The Pykara scheme is progressing satisfactorily. Power will be supplied at the same rate as by private companies.

Electric Lighting in Madras

The electrical engineer to the Government of Madras has prepared a scheme for the Madras Corporation for municipalising the distribution system for street lighting purposes. Figures have been worked out showing a large saving each year at the bulk-supply rate after laying down a complete distribution system. The power is at present supplied by the Madras Electric Supply Corporation, which also controls the 10,000 lamps now in use. It is said that the scheme can come into force without much extra cost, while the Corporation would be able to give much better service. The scheme is now under consideration by the Government.

Broadcasting in Madras

From the report of the Madras City Corporation, it is learnt that arrangements were made for the first time in that city during the past year to start a municipal broadcasting scheme which consisted for the time being of broadcasting vocal and instrumental music from a studio in Ripon Buildings every evening. The question of purchasing additional loud speakers required to be fitted up in the various parts of the city has received favourable consideration. The installation of small receiving sets in all the schools in the city is contemplated, so that lectures by radio may be given to the students.

Complaints in Bombay

Complaints on a large scale are being heard regarding the unsatisfactory nature of broadcasting programmes in Bombay. It is stated that no endeavour is being made to improve programmes, that the needs and requirements of the public are ignored by the Government, that no interest is taken by the Central Advisory Committee to assist in the management of the business of broadcasting, and that the Government has not yet opened more than two stations in India. From inquiries made it appears that the Government is very reluctant to incur more expenditure on broadcasting in view of the present financial stringency.

Electrical Imports into India, 1930-31

THE Department of Overseas Trade has issued a survey of the import trade of India during the fiscal year ended March 31st last prepared by the Trade Commissioner at Calcutta. This shows that the trade as a whole declined from 241 crores of rupees (£180,750,000) to 165 crores (£125,255,000), a decrease of 31 per cent. Exports fell by 29 per cent.

So far as the electrical imports were concerned, although there was a fall, it was of comparatively small proportions. Electrical machinery imports declined from Rs.240.5 lakhs to Rs. 239 lakhs (one lakh=£7,500); and imports of electrical instruments and apparatus from Rs.361 lakhs to Rs.310.5 lakhs. No details are given of the countries of origin of the electrical machinery imports but the trade in instruments and apparatus is analysed in some detail. The United Kingdom's share was was Rs.310.5 lakhs, against Rs.361 lakhs. Imports from Germany remained steady at Rs.43 lakhs. Imports from the United States were reduced from Rs.47.5 lakhs to Rs.44 lakhs, the Netherlands from Rs.16 lakhs to Rs.15 lakhs, Italy from Rs.14 lakhs to Rs. 8.5 lakhs, and Japan from Rs.9.5 lakhs to Rs.7 lakhs. On the other hand, the imports from "other countries" increased from Rs.16 lakhs to Rs.19.5 lakhs.

Details of the Trade

The imports of electric fans and parts thereof fell from Rs.40 lakhs to Rs.26 lakhs, the United Kingdom's share being reduced from Rs.19 lakhs to Rs.14.5 lakhs, that of Italy from Rs.12 lakhs to Rs.7 lakhs, and of the United States from Rs.3.5 to Rs.1 lakh. In electric wires and cables (rubber insulated), the imports fell from Rs.42 lakhs to Rs.37 lakhs, the United Kingdom's share being reduced from Rs.35 lakhs to Rs.28 lakhs. Imports from Germany increased from Rs.3 lakhs to Rs.4 lakhs. Although there was a slight increase in the imports of electric wires and cables (insulation other than rubber), from Rs.43 lakhs to Rs.44 lakhs, the United Kingdom's share fell from Rs.40.5 lakhs to Rs.38.5 lakhs. The imports of bare copper wire (electrolytic) other than telegraph and telephone wires decreased from Rs.29 lakhs to Rs.22 lakhs; the United Kingdom's share fell from Rs.21.5 lakhs to Rs.15 lakhs, while imports from Germany increased from Rs.1 lakh to Rs.2.5 lakhs. The Netherlands' share and that of Japan amounted to Rs.1.5 lakhs each. There was a small importation from the United States. Flash lights (including torches, pocket lamps, &c.) were imported to the value of Rs.7.5 lakhs as against Rs.11.5 lakhs in the previous year. The majority of these came from the United States, whose share was Rs.6 lakhs as against Rs.8 lakhs in the previous year. The United Kingdom's imports increased from Rs.19,000 to Rs.35,000. Automobile lamps were imported to the value of Rs.1 lakh, mainly from the Netherlands. In standard lighting lamps the imports fell from Rs.26 lakhs to Rs.24.5 lakhs. The United Kingdom's share increased slightly. Imports from the Netherlands declined from Rs.9 lakhs to Rs.8 lakhs. In electric lamps (other sorts) the imports fell from Rs.1.5 lakhs to Rs.1 lakh.

A Number of Decreases

The imports of telegraph and telephone instruments and apparatus fell slightly, from Rs.5.5 lakhs to Rs.5 lakhs, and the United Kingdom's share declined from Rs.5 lakhs to Rs.4 lakhs. Accumulators to the value of Rs.18.5 lakhs were imported, as against Rs.26 lakhs in the previous year. The United Kingdom's share fell from Rs.18 lakhs to Rs. 11.5 lakhs and that of the United States from Rs.3 lakhs to Rs.1.5 lakhs. The imports of electric lighting accessories and fittings (including switches) fell from Rs.16.5 lakhs to Rs.9.5 lakhs, the United Kingdom's share being reduced from Rs.10 lakhs to Rs.5 lakhs, that of Germany from Rs.3 lakhs to Rs.2 lakhs and that of the United States from Rs.1.5 lakhs to Rs.0.5 lakh. In meters, out of a total trade of Rs.7 lakhs, a reduction of Rs.2.5 lakhs, the United Kingdom supplied Rs.4.5 lakhs as compared with Rs.7 lakhs in the previous year. Electro-medical apparatus (including X-ray apparatus) was imported to the value of Rs.3 lakhs as compared with Rs.4 lakhs in the previous year. The United Kingdom's share fell from Rs.1 lakh to Rs.0.5 lakh. In switchboards (other than telegraph or telephone) the imports increased, the United Kingdom's share rising from Rs.2.5 lakhs to Rs.3 lakhs. Other sorts of electrical goods and apparatus were imported to the value of Rs.56 lakhs as compared with Rs. 57 lakhs in the previous year. Imports from the United Kingdom fell from Rs.38 lakhs to Rs.30 lakhs while those from the United States increased from Rs.8.5 lakhs to Rs.13 lakhs, and from Germany from Rs.7 lakhs to Rs.8 lakhs.

There was a slight increase to Rs.7.5 lakhs in the imports of radio apparatus, the United Kindgdom's proportion rising from Rs.4 lakhs to Rs.5 lakhs. The Netherlands was the next largest supplier, and smaller quantities were imported from the United States and Germany.

Correspondence

Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession

Rail Bonding

I note the article on Rail Bonding, by "A Traction Engineer," in your issue of May 29th, p. 902. Most of what is said in it is quite correct, but there is one statement to which I would like to take exception. It is stated that "The bond . . . may be of any of the following *types* . . .

(*b*) Welded Bonds.—The method of welding may be either gas or electric arc, or the more recent "Thermit" welding. This *type* is both more expensive and more difficult to establish . . . . ."

If "this *type*" refers only to "Thermit" welding I fully agree, but if it refers to the well-known welded bonds made of copper strands with two heads to be welded on the rail, I entirely disagree with the statement that "this type is both more expensive . . . ." Off hand and without going into figures which vary greatly with the rate of copper and workmanship, I do not hesitate to state that for the same conductivity of the joint a well-designed welded bond, either for electrical or gas welding, will cost a little above one half of the cost of a mechanically expanded terminal.

Furthermore, the welded bond is much stronger than any mechanical bond, although it can be much smaller and its greatest advantage, besides cost, is that a welded bond will keep its conductivity permanently while the best mechanical bond will become somewhat loose after a certain period in service. It is a well-known fact that, if mechanical bonds are not extremely well maintained, their resistance will soon reach the equivalent of several hundred feet of rail, while a good welded bond after several years in operation, without any maintenance, will have the same resistance as the first day it was installed, *i.e.*, its resistance will be equivalent to about three feet of rail.

Paris, *June 9th*, 1931. A LINEMAN.

I.E.E. Council Nominations

The I.E.E. Council representatives of the Associate Members presumably represent the interests of the bulk of these members, namely, those who are not yet eligible as, or are not in the position to become, full Members. The two representatives who remain on the Council were elected A.M. in 1909 and 1911, respectively, and both occupy posts of great responsibility. Of the two nominees, one was elected A.M. in 1912 and has attained the position of general sales manager for a large firm of world-wide repute, and the other was elected in 1919 and is the engineer and manager of a large municipal electricity department.

I do not know any of these gentlemen personally, and undoubtedly they have been chosen on their merits, but would it not be possible to arrange that all future nominees should be representative of those who *must* be Associate Members?

EDWARD HUGHES, M.I.E.E.

Brighton, *June 15th*, 1931.

kVA-hour Tariff

I should be greatly interested to hear if any electricity supply company has ever tried charging for the kVA-hour instead of the kWh.

This system should have great advantages, provided the generators were designed for unity power factor to avoid instability. Inefficient or low-power-factor motors, neon tubes, and even static condensers, when left on the mains inoperatively, would be penalised. Of course, a special arrangement would have to be made so that the power factor could not become leading and thus cause instability of the system.

Surely a consumer should be made to understand when he is consuming electricity wastefully, from the supply authorities' point of view, and if this is done there should be a great simplification of tariffs and meters.

Brazil, *May 26th*, 1931. INQUIRER.

Industrial Heating

The description of heating apparatus in your current number is exceedingly interesting, and reminds me of what has now become a matter of history, which no doubt you would like to put on record.

It is now nearly 30 years since, as chief engineer of the Linotype Co., I was compelled to make a melting apparatus for an emergency. The late Queen Alexandra was going to open a bazaar in the Hotel Cecil shortly after the dreadful accident in Paris, and the L.C.C. would not allow any gas to be used.

As gas heating was the only way to work the linotype machine, in which Her Majesty was very much interested, the impasse was only got over by putting in an electrical arrangement for melting the type metal in the machines. My very able assistant, Mark Barr, M.I.E.E., worked with me and we jointly patented a special electrical melting arrangement which completely got over the difficulty. The machine ran perfectly, and I think the application of electrical heating nearly 30 years ago in such a successful way should at least be looked upon now as an incident which really belongs to the classics.

JOHN PLACE, M.I.Mech.E., A.M.I.E.E.

Beckenham, *June 17th*, 1931.

Petrol-electric Vehicles

Mr. J. W. Burleigh's letter in your issue of the 12th inst. mentions that with his clutch scheme "for infrequent speeds over this (*i.e.*, overspeed) it would be easy to revert to the electrical drive"; also "efficiency for a large percentage of time will be about 96 per cent. . . . . ." We beg to emphasize that it is not a 'large percentage' of time and that for city work it may be as little as 10 per cent. Also we beg to repeat a sentence in our letter in your issue of May 1st: "Half the bus mileage is overdrive." With these two facts it is clear that the electrical machines, even in Mr. Burleigh's scheme, will be in circuit for a considerable time during which they are converting the full power; therefore, the machines cannot be much smaller than in the case of our transmission (which has no clutch).

The electrical machines must be capable of dealing with emergency conditions, such as fog or excessive traffic crawl up hill. It seems unsatisfactory to endeavour to compare all points in this correspondence, particularly as his design (with clutch) has not been tried out in service for an extended period.

T. S. MOTORS, LTD.,
H. K. Whitehorn,
Maidstone, *June 22nd*, 1931. *Electrical Engineer.*

Parliamentary Notes

[By our Special Parliamentary Reporter]

The London Transport Bill

At one of the sittings last week of the Joint Committee of Lords and Commons which is considering the London Passenger Transport Bill, it was stated that amendments had been prepared to give effect to the agreement which had been reached by the Minister of Transport with the main-line railway companies on their suburban services.

MR. WILFRED GREENE, K.C., counsel for the promoters, said there was a sub-clause in the proposed amendments which related to the furnishing by the amalgamated railway companies to the Minister of Transport of certain statistics and returns. That sub-clause had not yet been approved by the railway companies. If, as the promoters hoped, a clause to which the companies could agree were framed, the proposed amendment would require a little alteration. On the other hand, if agreement could not be reached, the proposed sub-clause would be submitted to the Committee for its determination, and they could decide whether it should be in the existing form or some other form.

SIR WILLIAM MCLINTOCK, the chartered accountant responsible for the finance of the scheme, was then cross-examined by counsel representing various transport interests affected by the Bill. Questioned by Mr. Ralph Bury on the position of the debenture holders of the London United Tramways, as compared with the preference and ordinary shareholders, the witness stated that the offer made to the debenture holders was favourable.

The position of local authorities in the London area which have electricity undertakings supplying electricity for their tramways was then raised. Mr. Greene said that the question of giving protection to local authorities in this respect was complicated and difficult. Proposals had been made with a view to reaching an agreement that would be satisfactory to those authorities, regulating the future position with regard to their electricity undertakings. Those proposals were at present before the local authorities concerned and, if agreement could be reached, a clause would be produced.

In reply to the Chairman, MR. GREENE said that the promoters agreed that this was a matter which had to be faced, but they took the view that it could most conveniently be treated when the clauses of the Bill were dealt with.

Mechanical Traffic Signals

On June 17th SIR GEORGE PENNY asked the Minister of Transport whether he would issue regulations making compulsory the use of mechanical and illuminated signalling arms on heavy mercantile and passenger-carrying vehicles.

MR. MORRISON said that the Highway Code described fully the hand signals that drivers should give when intending to stop, slow down, or change direction, while stating at the same time that where the appropriate signal could be given effectively by a suitable mechanical or electrical device there was no objection to its use. He did not think he would be at present justified in making the use of such mechanical or electrical devices compulsory in the case of any particular class or description of vehicle.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged, and all subsequent proceedings will be taken.

1929

22,065. "Formation of an insulating coating on parts of electrical apparatus." P. Brabant. November 10th, 1930. (Convention date not granted.) (315,798.)

35,243. "Methods of and means for determining altitude from aircraft." British Thomson-Houston Co., Ltd. November 17th, 1928. (349,426.)

36,182. "Methods of electro-deposition of zinc." U. C. Tainton. November 26th, 1929. (349,432.)

36,205. "Measurement of voltage and/or current of transformers." British Thomson-Houston Co., Ltd., J. G. Wellings, and C. G. Mayo. November 26th, 1929. (349,954.)

36,405. "Electric amplifier." Dubilier Condenser Co. (1925), Ltd. November 27th, 1928. (349,584.)

36,521. "Electrical inductance commutator." W. S. Eaton. November 28th, 1928. (349,925.)

37,050. "Loud speakers and other telephone receivers," J. Poliakoff. December 3rd, 1929. (349,630.)

38,388. "Circuit arrangement for alarm installations." Siemens & Halske Akt.-Ges. December 15th, 1928. (349,434.)

38,457. "Electric regulating and controlling arrangements." Akt.-Ges. Brown, Boveri et Cie. December 19th, 1928. (Addition to 307,046.) (349,478.)

39,448. "Electrical water storage heaters." A. E. White (Hynes & Cox Electric Corporation). December 24th, 1929. (349,480.)

1930

2,004. "Variable-speed electric drives." J. E. Pollak (Rossman Patents, Inc.). January 20th, 1930. (349,482.)

2,330. "Design of radio and sound-reproducing apparatus and the like." P. Henry and E. H. Roberts. January 23rd, 1930. (349,483.)

2,824. "Variable-resistance devices." Gramophone Co., Ltd., and A. H. Cooper. January 27th, 1930. (349,488.)

4,920. "Refining of metals in electric inductor furnaces." G. H. Clamer. February 20th, 1929. (349,446.)

5,049. "Pressure-operated electric switching devices." Sir J. Dewrance. February 14th, 1930. (349,447.)

5,148. "Photo-electric cells and circuits therefor." Westinghouse Electric & Manufacturing Co. February 15th, 1929. (349,636.)

5,238. "Electric shaft furnace for treating metal scrap or ores." J. Halasz. February 17th, 1930. (349,449.)

5,529. "Interlocked gastight electrical switch-plugs." Siemens Electric Lamps & Supplies, Ltd., and J. P. Annacker. February 19th, 1930. (349,494.)

5,925. "Electromagnetic separators." F. W. Windley and A. E. Windley. February 22nd, 1930. (349,550.)

6,047. "Electric cable terminals for telephone and like cables." Standard Telephones & Cables, Ltd., and E. Baguley. February 24th, 1930. (349,497.)

6,064. "Electrical relay devices." Westinghouse Brake and Saxby Signal Co., Ltd. April 22nd, 1929. (349,498.)

6,207. "Electric cable joints or terminals." W. W. Triggs (Ohio Brass Co.). February 25th, 1930. (349,500.)

6,251. "Slow-speed alternating-current motor mechanisms." P. Mayer. February 25th, 1930. (349,467.)

6,317. "Methods and apparatus for recording electrical variations, for example, for sound recording." S. Prisner and E. Wender. February 25th, 1930. (349,469.)

6,405. "Echo suppressors." Standard Telephones & Cables, Ltd., P. R. Thomas and K. G. Hodgson. February 26th, 1930. (349,513.)

6,434. "Electric switching arrangements for use in wireless receivers." Gramophone Co., Ltd., and A. H. Cooper. February 26th, 1930. (349,576.)

6,505. "Railway signalling apparatus." A. Becq. February 27th, 1929. (349,517.)

6,536. "Electric fuses." Callender's Cable & Construction Co., Ltd., and A. E. Wilson. February 27th, 1930. (349,519.)

6,715. "Electron-discharge tubes." Westinghouse Electric and Manufacturing Co. March 6th, 1929. (349,608.)

6,746. "Wave signalling systems." J. Robinson. February 28th, 1930. (349,557.)

6,748. "Automatic distress radio-telegraphic transmitter." L. Benedetti. June 26th, 1929. (349,558.)

6,755. "Machine for spot welding, making spark-plugs and other objects wholly or partly of metal by applying heat and pressure by means of a pair of electrodes." A. C. Spark Plug Co. September 26th, 1929. (349,610.)

6,799. "Apparatus for administering electrical current for therapeutic purposes." A. H. Harris and W. G. Taylor. March 1st, 1930. (349,615.)

6,959. "Submarine signalling cables." Electrical Research Products, Inc. April 18th, 1929. (349,642.)

7,490. "Construction of electromagnetic valves." J. L. Musgrave and R. Crittall & Co., Ltd. March 7th, 1930. (349,663.)

7,605. "Method of manufacturing electron-emitting cathodes for multiple-electrode thermionic valves." Loewe Audion Ges., and B. Wienecke. March 8th, 1929. (349,667.)

7,641. "Measurement of the out-of-balance capacities in telephone cables." Siemens Bros. & Co., Ltd., and A. Rosen. March 8th, 1930. (349,668.)

8,883. "Low-frequency amplifiers or the like." R. W. Anstey. March 20th, 1930. (349,687.)

9,090. "Electric condensers." Dubilier Condenser Co. (1925), Ltd. November 16th, 1929. (349,688.)

9,254. "Electric incandescent lamps and holders therefor." P. J. Beck. March 22nd, 1930. (349,691.)

10,208. "Radio apparatus." A. W. Ruyssenaers. March 30th, 1929. (349,706.)

11,026. "Devices for feeding oil-filled electric cables." Soc. Italiana Pirelli, and L. Emmanueli. April 7th, 1930. (349,710.)

11,574. "Thermionic devices." British Thomson-Houston Co., Ltd. April 17th, 1929. (349,719.)

11,795. "Electric cables and methods of repairing the same." Soc. Italiana Pirelli. April 25th, 1929. (349,722.)

11,969. "Electric condensers." D. M. McDonald and Dubilier Condenser Co. (1925), Ltd. April 15th, 1930. (349,726.)

13,274. "Adaptors, plugs and the like electrical connectors." A. J. Good. April 30th, 1930. (349,742.)

13,679. "Electroplating processes." Metals Protection Corporation." May 10th, 1929. (349,747.)

13,822. "Thermionic amplifiers." Marconi's Wireless Telegraph Co., Ltd. January 6th, 1930. (349,750.)

13,926. "Electrical reflector radiators for the heating of rooms." Maxim Soc. Anon. Fabrique d'Appareils Thermo-Electriques, and H. Hoffer. July 8th, 1929. (349,751.)

14,188. "Bearings for the rotating parts of electrical instruments and the like." Aron Electricity Meter, Ltd., E. W. Hill, A. White, and E. J. Riordan. May 8th, 1930. (349,756.)

15,240. "Relay systems for alternating-current telegraphy." C. Lorenz Akt.-Ges. July 13th, 1929. (349,763.)

15,797. "Radiators particularly applicable to the cooling of oil-immersed electrical transformers." British Thomson-Houston Co., Ltd., H. S. Holbrook, and J. M. Simpson. May 22nd, 1930. (349,766.)

16,339. "Apparatus for use in television and like systems." Marconi's Wireless Telegraph Co., Ltd. June 27th, 1929. (349,773.)

16,595. "Control of electric motors." Electro-Mechanical Brake Co., Ltd., and J. G. Smithson. May 29th, 1930. (349,777.)

16,788. "Electrical heating apparatus." G. T. Church. February 27th, 1930. (Divided application on 16,305/29.) (349,523.)

18,272. "Telephone instruments." Siemens Bros. & Co., Ltd., and E. A. Forceville. June 14th, 1930. (349,797.)

18,869. "Radio receivers for conveyances." Kolster-Brandes, Ltd. October 5th, 1929. (349,803.)

20,355. "Electric cells." Compagnie Générale des Piles Wonder. July 10th, 1929. (349,817.)

21,718. "Electrically driven winches." G. Pate and G. C. Newman. July 18th, 1930. (349,827.)

21,757. "Electric fuses." Siemens-Schuckertwerke Akt.-Ges. November 23rd, 1929. (349,828.)

22,997. "Electrolytically depositing aluminium." Aluminium-Industrie Akt.-Ges. August 24th, 1929. (349,842.)

23,578. "Lightning arrestors." Associated Electrical Industries, Ltd. August 6th, 1929. (349,845.)

23,723. "Electrically-heated salt-bath furnace for the heat-treatment of steel or the like." Siemens-Schuckertwerke Akt.-Ges. August 9th, 1929. (349,846.)

25,059. "Method of and means for synchronising electric remote indicating systems." Ges. für Elektrische Apparate. August 22nd, 1929. (349,853.)

25,479. "Submarine communication cables." Siemens-Schuckertwerke Akt.-Ges. November 2nd, 1929. (349,857.)

25,698. "Electric discharge tubes, discharge lamps, or the like." General Electric Co., Ltd. August 29th, 1929. (349,859.)

27,790. "Automatic control equipments for mercury-arc rectifiers." British Thomson-Houston Co., Ltd. September 17th, 1929. (349,874.)

27,952. "Device for damping the oscillations of overhead lines." Siemens-Schuckertwerke Akt.-Ges. March 15th, 1930. (348,989.)

28,356. "Dynamos." R. Bosch Akt.-Ges. September 27th, 1929. (348,991.)

28,890. "Fuses." Associated Electrical Industries, Ltd. September 26th, 1929. (349,881.)

29,741. "Electric signalling systems for indicating measurements at a distant point." British Thomson-Houston Co., Ltd. October 4th, 1929. (349,884.)

Patents in 1930

The report of the Comptroller-General of Patents, Designs, and Trade Marks for the past year shows that for the first time since 1924 there was a falling-off of business in the Patent Office. The number of applications for patents declined from 39,898 to 39,359, the number of provisional patents from 24,618 to 24,477, and the number of complete specifications from 25,366 to 24,993. The number of patents sealed, however, rose from 18,937 to 20,765. The number of designs and trade marks registered were 20,169 and 6,728, respectively, comparing with 22,072 and 7,455 in 1929. In reviewing the trend of invention during the year, the Comptroller-General says that in the electrical industry the adoption of the grid system of distribution has resulted in a noticeable increase in inventions relating to the suspension and insulation of overhead high-voltage lines, pressure-compensating devices in oil-filled cables, high-voltage switches, &c. Electric motor-control systems show an increase of 25 per cent. in the number of applications, due almost entirely to improvements in electric braking and stopping. In connection with telegraphy and telephony there has been marked activity in short-wave wireless, particularly in directional systems depending upon the use of aerials of the beam type; the associated problem of "fading" has received considerable attention. some interesting work is also being done in connection with the use of ultra-short wave lengths for special purposes, such as the aiding of marine and aerial navigation. Much attention is being directed to high-speed cable telegraphy, and there have also been a number of inventions dealing with problems raised by the projected transatlantic telephone cable, a project which, if carried through successfully, will be a remarkable technical achievement. The totalisator is being developed along electrical lines by the introduction of some of the features of automatic telephony, with the view of rendering the apparatus self-checking and more accurate and speedy. In this development, ticket-issuing apparatus and indicating devices of the large-display, scoring-board type are sharing. There is still much activity in inventions concerned with the perfecting of wireless valves, neon and like discharge lamps, photo-electric cells for "talkies," and mercury-vapour rectifiers, but the boom in ultra-violet ray lamps for therapeutic purposes has not been maintained.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Accrington.—New infants' department and extension of junior department for Spring Hill Council School; H. Sanderson, borough engineer.

Alton (HANTS.).—Houses (50), Anstey, for the U.D.C.; surveyor.

Aylesbury (BUCKS.).—Houses (80) for the T.C.; borough engineer.

Birmingham.—Electric vehicle garage, St. James's Road; manager, Salvage Department.

Bishop's Stortford (HERTS.).—Improvements at Poor Law Institution for the C.C. Public Assistance Committee.

Blackrod (CHORLEY).—Houses (28) for the U.D.C.; surveyor.

Bolton.—Extensions to bank, Deansgate, for Martin's Bank, Ltd.; E. C. Aldridge, architect, 14, Castle Street, Liverpool.

Bolton Colliery.—Houses (65) for the South Shields R.D.C. (£12,530); W. D. Allison, contractor, Whitburn.

Bournemouth.—Houses (23), Cranleigh Close; G. B. Ive. Houses (139), Iford Lane estate; borough engineer. Showrooms, shops and offices, Commercial and Avenue Roads; Prices, Tailors, Ltd. Shops, offices and flats, Curzon and Windham Roads; C. V. Miller.

Bradford.—Premises, Clayton Road and Hollingworth Lane, for the Great Horton Industrial Society, Ltd.; B. D. Fairbanks and Son, architects, Hallfield Chambers, Manningham Lane.

Brownhills (STAFFS.).—Houses (34) for the U.D.C.; F. & H. Judd, builders.

Buckinghamshire.—Grammar school, Slough, for the county E.C.; C. H. Riley, county architect, Aylesbury.

Bury.—Alterations to tramway office, Market Place; borough engineer, Municipal Offices.

Buxton.—Extension of sewage disposal works, Ashwood Dale; F. Langley, borough engineer.

Calne (WILTS.).—Houses (40) for the T.C.; borough surveyor.

Carlisle.—Extensions to St. Cuthbert's Church; J. H. Martindale, architect, Eaglesfield Abbey Rooms, Castle Street.

Cheshire.—Modern and primary schools, Kelsall, and Council school, Little Sanghall, for the county E.C.; F. A. Browne, county architect, Newgate Street, Chester.

Colne.—School, Hareholt; borough surveyor.

Conisborough (YORKS.).—Houses and shopping centre, for the U.D.C.; surveyor.

Crompton.—Extensions to Crompton Hall Secondary School for C.E. Authorities; F. Thorpe, Union Bank Chambers, Church Lane, Oldham.

Croydon.—Extensions, Town Hall (£75,000); H. Berney and H. Macintosh, architects. Extensions, Ingram School (£4,223); J. Mansell. Additions, Old Palace School, Old Palace Road; Rees & Partners, 31, High Street.

Darlington.—Rebuilding business store, High Row, for H. Binns, Son & Co., Ltd.

Dartford.—Extensions to biscuit factory, Hythe Street; Daren, Ltd.

Derby.—Houses (2,000), Humbledon Farm; borough engineer.

Dudley.—Bakery, Priory estate, for the Dudley Co-operative Society, Ltd.; Webb & Gray, architects, High Street.

Dunstable (BEDS.).—Houses (93) for the T.C.; T. Alwyn Lloyd, architect.

Durham.—Houses (49), Leadgate, for the R.D.C.; R. Barrow, Coundon, Bishop Auckland. R.C. school, Monkton; R. Burke, architect, 12, Grey Street, Newcastle-on-Tyne. School, Ryton Woodside, for the county E.C.; F. Willey, architect, 34, Old Elvet.

East Lothian.—Alterations and additions to Kingside Public School, C.C.; county architect, Property and Works Department, Haddington.

Esher and Dittons.—Houses (24) for the U.D.C.; surveyor.

Essex.—Practical instruction centres, Wickford and Rainham, for the county E.C.; J. Stuart, county architect, Chelmsford.

Falkirk.—Housing scheme for the Corporation (£29,510); burgh surveyor.

Falkland.—Linoleum factory (£120,000) for the Scottish Co-operative Wholesale Society, Ltd.; the manager, Shieldhall, Glasgow.

Gillingham (KENT).—Bank for Westminster Bank, Ltd.; W. Braxton Sinclair, architect, 8, Buckingham Street, W.C.

Glasgow.—Hall, Dalveen Street; A. Allan, junr.

Grangetown (MIDDLESBROUGH).—R.C. school; J. Shipley, 57, Granville Road.

Grasmere (WESTMORLAND).—R.C. church, Townend; R. Mercer, architect, Preston.

Grimsby.—Elementary school, Highfield, for the E.C.

Hastings.—Electric lighting installation, Guestling Hall; A. Parkin Brown.

Herne Bay.—Alterations and additions, 155, Mortimer Street; F. W. Woolworth & Co., Ltd.

Heywood.—Houses (50), Peel Lane estate; borough surveyor.

Irish Free State.—(CORK).—Additions and alterations to National schools, North Main Street; B. O'Flynn, architect, 60, South Mall. (DUBLIN).—Houses (137) and reconstruction of existing dwellings for the Corporation; city architect, Exchange Buildings, Lord Edward Street. (SLIGO).—Houses (59) for the Corporation; J. P. Quinn, borough surveyor, Town Hall.

Kippax.—Houses (22); W. Boardman, engineer and surveyor, Tadcaster R.D.C., Kirkgate.

Leamington.—Houses (54); hon. secretary, Leamington Slum Clearance Society, Ltd.

Leeds.—Buildings, Regent Street; Central Garage, Ltd.

Leigh (LANCS.).—Elementary school, Etherstone Street (320 places), for the E.C.; T. A. Clare, borough surveyor, Town Hall.

London.—(EAST HAM).—Spiritualistic church, Stone Road and Shrewsbury Road; J. Harris & Co. (NORBURY).—Extensions, Manor school (£13,322); Perrys (Ealing), Ltd. (SHOREDITCH).—Hospital, Laburnum Street (£9,000); borough engineer. (STOKE NEWINGTON).—Conversion of baths for various winter functions (electrical work); borough engineer. (WOOLWICH).—Municipal offices (£50,000) for the T.C.; borough surveyor.

Louth (LINCS.).—Houses (64) for the T.C.; Pearson & Blackwell, builders, Doncaster. County infectious diseases hospital for the Lindsey C.C.

Maidstone.—Extensions, Week Street, for Messrs. Gergel.

Manchester.—Reference library, St. Peter's Square; E. V. Harris, architect, 29, St. James's Square, Pall Mall, London, S.W.1. Telephone exchange, Failsworth; H.M. Office of Works (Contracts Branch), King Charles Street, London, S.W.1. Public wash-houses, Alexandra Street, Collyhurst, and Corporation Street, Abbey Hey, Gorton, for the T.C.; H. Price, city architect, Town Hall.

Margate.—Conversion of premises into public library for the T.C.; borough surveyor.

Midhurst (SUSSEX).—Houses (24) for the R.D.C.; surveyor.

Morden.—Estate development, near Raynes Park Station; G. Blay.

Newbury (BERKS.).—Junior school for the borough E.C.; director of education.

Newcastle-on-Tyne.—Extensions to Adelphi Hotel, Shakespeare Street; J. R. Rutherford & Sons, Jesmond. Rebuilding of Burton House Hotel; J. Jackson, contractor, Corporation Street.

Northallerton.—Extensions to Rutson Hospital; T. & J. Willoughby, county architect.

Northumberland.—Dairy premises at Cowgate, Keaton, for the Newcastle Co-operative Society, Ltd.; architect's department, 90, Westmorland Road, Newcastle-on-Tyne. School, North Broomhill (£9,000); G. Towers, 77, Union Street, Blyth.

Nottingham.—Houses (936), Bells Lane estate; borough engineer.

Oldbury.—Shops, Pottery Road, Warley; W. Greenwood, engineer and surveyor, Council Offices.

Oldham.—Dairy buildings (£16,000); architect's department, Co-operative Wholesale Society, Ltd., 1, Balloon Street, Manchester.

Oxford.—Senior church schools, Kidlington; R. F. Dodd and G. T. Gardner, architects.

Paignton.—Estate development, Marldon Road; Eastley & Co.

Penrith.—Housing scheme, Penny Hill; U.D.C. surveyor.

Reading.—Houses (480), Whitley estate, for the T.C.; borough surveyor.

Redcar.—Extension of Coatham School for the governors (£10,000); C. Hebditch, Briardale, West Road, Loftus, Yorks. Extension of R.C. schools; Kitching & Co., 21, Albert Road, Middlesbrough.

Repton (DERBYSHIRE).—Houses (92) for the R.D.C.; surveyor.

Richmond (SURREY).—Houses (162), Petersham, for the T.C.; borough surveyor.

Rutherglen.—Houses (200) with electric lighting work for the T.C.; H. Inglis, burgh engineer.

Shotley Bridge (DURHAM).—Extensions, Shotley Bridge Colony; T. Holford, city architect, Town Hall, Newcastle.

Southend-on-Sea.—Reconstruction of cinema for the Mascot Cinemas, Ltd.; N. Evans, architect, Clarence Chambers, 41, High Street.

Spalding (LINCS.).—Market and fire station (£18,000) for the U.D.C.; surveyor.

Standish (LANCS.).—Houses (40) for the U.D.C.; surveyor.

Stockton-on-Tees.—Rebuilding of Green Bushes Hotel; A. Mcleod, Ltd., Westbury Street, Thornaby-on-Tees.

Stretford.—Clearance scheme, Clifford Ward; U.D.C. surveyor. Works extensions, Ayres Road; National Corrugated Paper Co., Ltd.

Sunderland.—Municipal aerodrome; borough engineer. R.C. church, Humbleton estate, Durham Road; rural dean.

Surrey.—Schools, High View estate, Beddington, Raynes Park, and Tolworth, for the county E.C.; W. W. Finny, secretary, Kingston-on-Thames.

Swansea.—Houses (140), Cockett Farm estate; S. Davies, builder. Houses (200), Sketty Park estate, library, Oystermouth, and elementary school, Cockett (£17,598); borough architect. Civic buildings (£343,263); E. Turner & Sons, Ltd. Institute, Danygraig Terrace; trustees, Mount Calvary Baptist Church.

Twickenham (MIDDLESEX).—Kneller School for the borough E.C.; director of education.

Upholland (LANCS.).—Houses (27) for the U.D.C.; A. Hunt, surveyor.

Worsop (NOTTS.).—Houses (24) for the U.D.C.; surveyor.

Warwick.—Houses (138), Packmores estate; E. Wormwell, borough engineer.

Wellington (SALOP).—Houses (42) for the R.D.C.; J. H. T. Hickman, architect, 10a, Walker Street.

Welwyn Garden City (HERTS.).—Parish church of St. Francis; Kenyon & de Soissons, architects.

West Hartlepool.—Conversion of Winthorpe House, Victoria Road, into showrooms; W. Pearsons & Son, Burn Road.

West Riding.—Senior mixed school and caretaker's house, Whitwood; education officer, County Hall, Wakefield.

West Sussex.—Police headquarters, Chichester, for the C.C.; H. P. Roberts, county architect, North Street, Chichester.

Whalley (NEAR BLACKBURN).—Extension of Brockhall Institution; steward, Calderstones Certified Institution for Mentally Defectives.

Winchester (HANTS.).—Houses (60) for the T.C.; P. H. Warwick, city engineer.

Wolstanton.—Extensions, Ellison Street schools (£5,560) for the E.C.; Sambrook Bros., builders.

Wolverhampton.—Junior school for the Royal Orphanage; Joseph and H. W. Lavender, architects.

Wrexham.—Houses (130) and flats (40), Acton Park, for the T.C.; Lockwood, Abercrombie & Saxon, architects, Cathedral Chambers, Chester.

New Work for Contractors

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Alton (HANTS.).—Houses (50), Anstey, for the U.D.C.; surveyor.

Aylesbury (BUCKS.).—Houses (80) for the T.C.; borough engineer.

Birmingham.—Electric vehicle garage, St. James's Road; manager, Salvage Department.

Bishop's Stortford (HERTS.).—Improvements at Poor Law Institution for the C.C. Public Assistance Committee.

Blackrod (CHORLEY).—Houses (28) for the U.D.C.; surveyor.

Bolton.—Extensions to bank, Deansgate, for Martin's Bank, Ltd.; E. C. Aldridge, architect, 14, Castle Street, Liverpool.

Bolton Colliery.—Houses (65) for the South Shields R.D.C. (£12,530); W. D. Allison, contractor, Whitburn.

Bournemouth.—Houses (23), Cranleigh Close; G. B. Ive. Houses (139), Iford Lane estate; borough engineer. Showrooms, shops and offices, Commercial and Avenue Roads; Prices, Tailors, Ltd. Shops, offices and flats, Curzon and Windham Roads; C. V. Miller.

Bradford.—Premises, Clayton Road and Hollingworth Lane, for the Great Horton Industrial Society, Ltd.; B. D. Fairbanks and Son, architects, Hallfield Chambers, Manningham Lane.

Brownhills (STAFFS.).—Houses (34) for the U.D.C.; F. & H. Judd, builders.

Buckinghamshire.—Grammar school, Slough, for the county E.C.; C. H. Riley, county architect, Aylesbury.

Bury.—Alterations to tramway office, Market Place; borough engineer, Municipal Offices.

Buxton.—Extension of sewage disposal works, Ashwood Dale; F. Langley, borough engineer.

Calne (WILTS.).—Houses (40) for the T.C.; borough surveyor.

Carlisle.—Extensions to St. Cuthbert's Church; J. H. Martindale, architect, Eaglesfield Abbey Rooms, Castle Street.

Cheshire.—Modern and primary schools, Kelsall, and Council school, Little Sanghall, for the county E.C.; F. A. Browne, county architect, Newgate Street, Chester.

Colne.—School, Hareholt; borough surveyor.

Conisborough (YORKS.).—Houses and shopping centre, for the U.D.C.; surveyor.

Crompton.—Extensions to Crompton Hall Secondary School for C.E. Authorities; F. Thorpe, Union Bank Chambers, Church Lane, Oldham.

Croydon.—Extensions, Town Hall (£75,000); H. Berney and H. Macintosh, architects. Extensions, Ingram School (£4,223); J. Mansell. Additions, Old Palace School, Old Palace Road; Rees & Partners, 31, High Street.

Darlington.—Rebuilding business store, High Row, for H. Binns, Son & Co., Ltd.

Dartford.—Extensions to biscuit factory, Hythe Street; Daren, Ltd.

Derby.—Houses (2,000), Humbledon Farm; borough engineer.

Dudley.—Bakery, Priory estate, for the Dudley Co-operative Society, Ltd.; Webb & Gray, architects, High Street.

Dunstable (BEDS.).—Houses (93) for the T.C.; T. Alwyn Lloyd, architect.

Durham.—Houses (49), Leadgate, for the R.D.C.; R. Barrow, Coundon, Bishop Auckland. R.C. school, Monkton; R. Burke, architect, 12, Grey Street, Newcastle-on-Tyne. School, Ryton Woodside, for the county E.C.; F. Willey, architect, 34, Old Elvet.

East Lothian.—Alterations and additions to Kingside Public School, C.C.; county architect, Property and Works Department, Haddington.

Esher and Dittons.—Houses (24) for the U.D.C.; surveyor.

Essex.—Practical instruction centres, Wickford and Rainham, for the county E.C.; J. Stuart, county architect, Chelmsford.

Falkirk.—Housing scheme for the Corporation (£29,510); burgh surveyor.

Falkland.—Linoleum factory (£120,000) for the Scottish Co-operative Wholesale Society, Ltd.; the manager, Shieldhall, Glasgow.

Gillingham (KENT).—Bank for Westminster Bank, Ltd.; W. Braxton Sinclair, architect, 8, Buckingham Street, W.C.

Glasgow.—Hall, Dalveen Street; A. Allan, junr.

Grangetown (MIDDLESBROUGH).—R.C. school; J. Shipley, 57, Granville Road.

Grasmere (WESTMORLAND).—R.C. church, Townend; R. Mercer, architect, Preston.

Grimsby.—Elementary school, Highfield, for the E.C.

Hastings.—Electric lighting installation, Guestling Hall; A. Parkin Brown.

Herne Bay.—Alterations and additions, 155, Mortimer Street; F. W. Woolworth & Co., Ltd.

Heywood.—Houses (50), Peel Lane estate; borough surveyor.

Irish Free State.—(CORK).—Additions and alterations to National schools, North Main Street; B. O'Flynn, architect, 60, South Mall. (DUBLIN).—Houses (137) and reconstruction of existing dwellings for the Corporation; city architect, Exchange Buildings, Lord Edward Street. (SLIGO).—Houses (59) for the Corporation; J. P. Quinn, borough surveyor, Town Hall.

Kippax.—Houses (22); W. Boardman, engineer and surveyor, Tadcaster R.D.C., Kirkgate.

Leamington.—Houses (54); hon. secretary, Leamington Slum Clearance Society, Ltd.

Leeds.—Buildings, Regent Street; Central Garage, Ltd.

Leigh (LANCS.).—Elementary school, Etherstone Street (320 places), for the E.C.; T. A. Clare, borough surveyor, Town Hall.

London.—(EAST HAM).—Spiritualistic church, Stone Road and Shrewsbury Road; J. Harris & Co. (NORBURY).—Extensions, Manor school (£13,322); Perrys (Ealing), Ltd. (SHOREDITCH).—Hospital, Laburnum Street (£9,000); borough engineer. (STOKE NEWINGTON).—Conversion of baths for various winter functions (electrical work); borough engineer. (WOOLWICH).—Municipal offices (£50,000) for the T.C.; borough surveyor.

Louth (LINCS.).—Houses (64) for the T.C.; Pearson & Blackwell, builders, Doncaster. County infectious diseases hospital for the Lindsey C.C.

Maidstone.—Extensions, Week Street, for Messrs. Gergel.

Manchester.—Reference library, St. Peter's Square; E. V. Harris, architect, 29, St. James's Square, Pall Mall, London, S.W.1. Telephone exchange, Failsworth; H.M. Office of Works (Contracts Branch), King Charles Street, London, S.W.1. Public wash-houses, Alexandra Street, Collyhurst, and Corporation Street, Abbey Hey, Gorton, for the T.C.; H. Price, city architect, Town Hall.

Margate.—Conversion of premises into public library for the T.C.; borough surveyor.

Midhurst (SUSSEX).—Houses (24) for the R.D.C.; surveyor.

Morden.—Estate development, near Raynes Park Station; G. Blay.

Newbury (BERKS.).—Junior school for the borough E.C.; director of education.

Newcastle-on-Tyne.—Extensions to Adelphi Hotel, Shakespeare Street; J. R. Rutherford & Sons, Jesmond. Rebuilding of Burton House Hotel; J. Jackson, contractor, Corporation Street.

Northallerton.—Extensions to Rutson Hospital; T. & J. Willoughby, county architect.

Northumberland.—Dairy premises at Cowgate, Keaton, for the Newcastle Co-operative Society, Ltd.; architect's department, 90, Westmorland Road, Newcastle-on-Tyne. School, North Broomhill (£9,000); G. Towers, 77, Union Street, Blyth.

Nottingham.—Houses (936), Bells Lane estate; borough engineer.

Oldbury.—Shops, Pottery Road, Warley; W. Greenwood, engineer and surveyor, Council Offices.

Oldham.—Dairy buildings (£16,000); architect's department, Co-operative Wholesale Society, Ltd., 1, Balloon Street, Manchester.

Oxford.—Senior church schools, Kidlington; R. F. Dodd and G. T. Gardner, architects.

Paignton.—Estate development, Marldon Road; Eastley & Co

Penrith.—Housing scheme, Penny Hill; U.D.C. surveyor.

Reading.—Houses (480), Whitley estate, for the T.C.; borough surveyor.

Redcar.—Extension of Coatham School for the governors (£10,000); C. Hebditch, Briardale, West Road, Loftus, Yorks. Extension of R.C. schools; Kitching & Co., 21, Albert Road, Middlesbrough.

Repton (DERBYSHIRE).—Houses (92) for the R.D.C.; surveyor.

Richmond (SURREY).—Houses (162), Petersham, for the T.C.; borough surveyor.

Ruthergien.—Houses (200) with electric lighting work for the T.C.; H. Inglis, burgh engineer.

Shotley Bridge (DURHAM).—Extensions, Shotley Bridge Colony; T. Holford, city architect, Town Hall, Newcastle.

Southend-on-Sea.—Reconstruction of cinema for the Mascot Cinemas, Ltd.; N. Evans, architect, Clarence Chambers, 41, High Street.

Spalding (LINCS.).—Market and fire station (£18,000) for the U.D.C.; surveyor.

Standish (LANCS.).—Houses (40) for the U.D.C.; surveyor.

Stockton-on-Tees.—Rebuilding of Green Bushes Hotel; A. Mcleod, Ltd., Westbury Street, Thornaby-on-Tees.

Stretford.—Clearance scheme, Clifford Ward; U.D.C. surveyor. Works extensions, Ayres Road; National Corrugated Paper Co., Ltd.

Sunderland.—Municipal aerodrome; borough engineer. R.C. church, Humbleton estate, Durham Road; rural dean.

Surrey.—Schools, High View estate, Beddington, Raynes Park, and Tolworth, for the county E.C.; W. W. Finny, secretary, Kingston-on-Thames.

Swansea.—Houses (140), Cockett Farm estate; S. Davies, builder. Houses (200), Sketty Park estate, library, Oystermouth, and elementary school, Cockett (£17,598); borough architect. Civic buildings (£343,263); E. Turner & Sons, Ltd. Institute, Danygraig Terrace; trustees, Mount Calvary Baptist Church.

Twickenham (MIDDLESEX).—Kneller School for the borough E.C.; director of education.

Upholland (LANCS.).—Houses (27) for the U.D.C.; A. Hunt, surveyor.

Worsop (NOTTS.).—Houses (24) for the U.D.C.; surveyor.

Warwick.—Houses (138), Packmores estate; E. Wormwell, borough engineer.

Wellington (SALOP).—Houses (42) for the R.D.C.; J. H. T. Hickman, architect, 10a, Walker Street.

Welwyn Garden City (HERTS.).—Parish church of St. Francis; Kenyon & de Soissons, architects.

West Hartlepool.—Conversion of Winthorpe House, Victoria Road, into showrooms; W. Pearsons & Son, Burn Road.

West Riding.—Senior mixed school and caretaker's house, Whitwood; education officer, County Hall, Wakefield.

West Sussex.—Police headquarters, Chichester, for the C.C.; H. P. Roberts, county architect, North Street, Chichester.

Whalley (NEAR BLACKBURN).—Extension of Brockhall Institution; steward, Calderstones Certified Institution for Mentally Defectives.

Winchester (HANTS.).—Houses (60) for the T.C.; P. H. Warwick, city engineer.

Wolstanton.—Extensions, Ellison Street schools (£5,560) for the E.C.; Sambrook Bros., builders.

Wolverhampton.—Junior school for the Royal Orphanage; Joseph and H. W. Lavender, architects.

Wrexham.—Houses (130) and flats (40), Acton Park, for the T.C.; Lockwood, Abercrombie & Saxon, architects, Cathedral Chambers, Chester.